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PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

(OF LONDON.)



VOL. I. ¹2.

SESSIONS 1855-6 and 1856-7. — 1858

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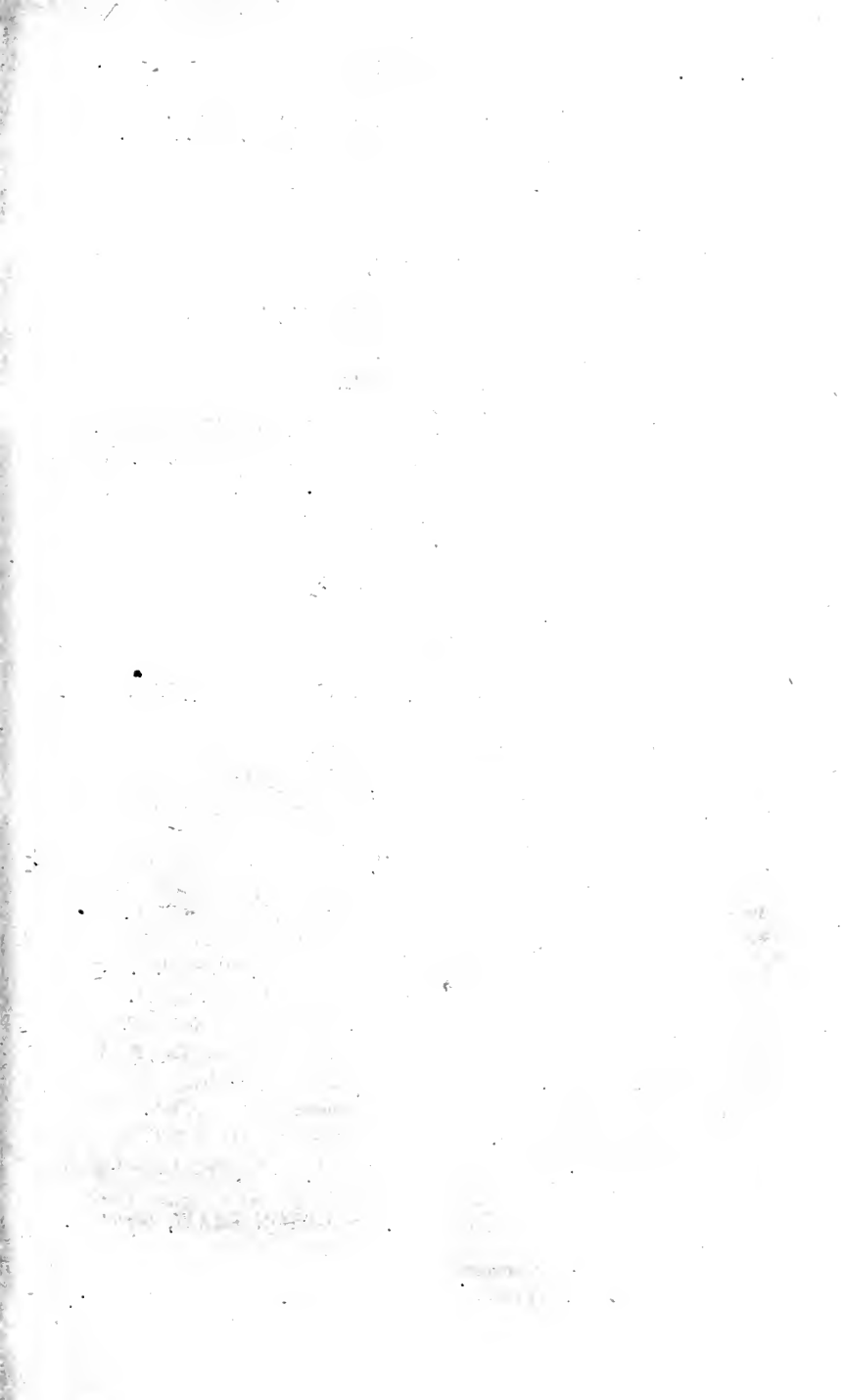
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PROCEEDINGS

OF

THE ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

SESSION 1855-6.

First Meeting, November 12, 1855.

REAR-ADMIRAL F. W. BEECHIEY, PRESIDENT, in the Chair.

Capt. R. Collinson, R.N., C.B.; Mr. R. Anderson, Surgeon R.N.; the Rev. Brownrigg Smith, M.A.; and Thomas W. Laroche, Esq., were elected Fellows.

Sir Roderick Murchison announced the recent erection of the obelisk on the quay of Greenwich Hospital to the memory of Lieut. Bellot, in the following terms:—

“Mr. President and Gentlemen,—To the assembled geographers who originated the subscription for the Bellot Testimonial, I beg to announce that an obelisk of granite has just been erected in memory of the noble-minded French officer, who, in the year 1853, perished amid the Polar ice, whilst serving in the last British expedition that sailed in search of our illustrious member, Franklin. At the same time I have to inform you, that about 1500*l.*, the surplus of the subscriptions beyond the cost of the obelisk, having been already partially distributed, will shortly be entirely divided among the five sisters of the deceased.

“Not attempting on this occasion to give a sketch of the life of Bellot, I may be permitted to say, that whilst in his earlier naval services he gained the esteem of British sailors by his gallant co-operation, whether in the Rio de la Plata or in suppressing the African slave trade, he afterwards won the affection of all his associates during two perilous and adventurous voyages in search of our missing explorers. In short, the fortitude and daring he exhibited in moments of peril, and the benevolence which shone out in his bright but short career, were eminently calculated to rouse that warm and genial sympathy for his fate throughout Britain which the monument is destined to mark.

“As Chairman of the Committee appointed by the General Meet-

ing of 1853, over which I had the honour to preside, let me inform you that through the hearty co-operation of Her Majesty's Government and particularly of the Admiralty, and the good-will of the Governors of Greenwich Hospital, a site was obtained which testifies at once our gratitude and admiration; for the obelisk, designed by Mr. P. Hardwick, is erected on the bank of the river from which the young French officer sailed, in the 'Phoenix,' commanded by Captain Inglefield, and bears on its sides, which face the river and our great Naval Hospital, the honoured name of 'Bellot.'

"It having been resolved that a Cenotaph to the memory of Franklin and his companions is to be placed in the hall of Greenwich Hospital—which is held to be sacred to the memory of the noblest of our seamen—I am sure you will unite with me in rejoicing that the memorial to the young French officer should thus be raised in proximity to the tribute of national regard which is paid to our lamented Polar heroes.

"It must further be highly gratifying to all members of the Royal Geographical Society to see that our efforts to do justice to a French officer have been duly appreciated in his native country, as testified by the presence on this occasion of Count de Persigny, the Ambassador who worthily represents a Sovereign gifted with extensive geographical knowledge, and who has himself taken a deep interest in British Polar expeditions. If Englishmen, to their credit, willingly came forward to manifest their sense of the noble bearing of a young Frenchman, let them remember that France, ever prompt to reward her own brave sons, had also her testimonial; and that the Emperor of the French assigned from his own purse a pension to the family of Bellot.

"May, then, the monument, which was erected at the call of the Royal Geographical Society in honour of the young Frenchman, be, for ages to come, a symbol of the union of the two countries in the cause of humanity, and for the advancement of our science."

The Count de Persigny, the French Ambassador, then rose and replied—

"Monsieur le Président,—Permettez moi de remercier Sir Roderick Murchison de ce qu'il vient de dire en faveur de l'Empereur et de la France. Le sujet dont il vient de vous entretenir m'a vivement intéressé. Ce que j'admire dans cette circonstance ce n'est pas seulement le dévouement de M. Bellot au milieu des plus rudes épreuves, mais c'est par-dessus tout, la sympathie que sa mort a excitée dans toute l'Angleterre. Le spectacle extraordinaire d'une grande nation pleurant sur la tombe d'un simple officier Français, a profondément touché les cœurs du peuple Français; cette circonstance a plus fait pour fortifier l'alliance des deux pays que les calculs de la politique; et c'est un grand honneur pour votre Société d'avoir ainsi provoqué une démonstration qui a si fort contribué à l'union des deux peuples."

Captain Washington, R.N., Hydrographer to the Admiralty, said—

"I need hardly say with what gratification, in common I am sure with all here assembled, I have listened to the eloquent words of the French Ambassador, and I can truly testify that his Excellency's sentiments are shared by more than one eminent person of his nation. It is scarcely a month since I had the honour of an interview with Admiral Bruat, Commander-in-Chief of the French fleet in the Black Sea, and while talking to him on board the 'Montebello,' his flag-ship, lying off Sebastopol, he expressed the very same feeling at the lively sympathy which the death of Bellot had caused throughout this country, and a similar hope that it might be the means of cementing the alliance between our two nations. Most cordially do we join in that hope.

"And while on the subject of Arctic discovery, I may mention, as a singular coincidence, that at one o'clock this day the Admiralty received a telegraphic communication from Aberdeen, stating that Capt. Kellet's vessel, the 'Resolute,' which was abandoned in the ice on the 1st of August, 1854, had drifted out to Davis's Straits, 1200 miles from the spot where it was originally left. The vessel had been taken possession of by an American whaler."

The Papers read were—

1. *On the Australian Alps.* By Dr. MÜLLER.

Communicated by the COLONIAL OFFICE.

LEAVING Melbourne on the 1st of November, I travelled through the Fern-tree Gullies to the Latrobe River, and thence to the Avon, and ascended Mount Wellington from the ranges of the latter stream on the 14th of November. The altitude of this mountain appears to me more than 5000 feet, a snow-storm lasting here, even at so advanced a season, for a whole day. The main journey to the central part of the Australian Alps I commenced again from the Avon on the 22nd November, proceeding to the Mitchell River, and thence to the Dargo. Following along the scrubby ranges between this river and the Wentworth, I crossed the dividing range between the waters of Gipps' Land and those of the Murray River near the upper part of the Cabongra. Thence I traversed a grassy table-land in a north-easterly direction along the Cabongra downward, until the country appeared practicable, towards the N., to reach the highest part of the Bogong Ranges.

The ranges hereabouts, which never before have been traversed by civilized men, are generally fertile, and timbered with the mountain white gum-tree (*Eucalyptus phlebophylla*).

On the 3rd December I ascended the south-eastern of the two highest mountains of the Bogong Range. In its upper regions even the vegetation of bushes ceases, the slightly arched summit being covered with Alpine grasses and herbs. About noon I ascertained the boiling-water point to be 198° according to Fahrenheit's thermometer, and 75° according to Reaumur's scale. I am at present unable to calculate from this the barometric height and approximative altitude of this mountain, but I believe that it will be found nearly 7000 feet above the level of the sea. The much more abrupt and yet higher summit of the north-western mount I ascended from the Upper Mitta Mitta, which skirts its base, on the 6th December. The boiling water point I observed again to be 198° F. (although the elevation of this mountain is unquestionably greater to the extent of several hundred feet), a circumstance

owing to the greater atmospherical pressure of that day. The observation was instituted during the afternoon, about three o'clock. On both these mountains mighty masses of snow lay far below the summits, lodging chiefly in the ravines, and these never melt entirely under the heat of the summer sun.

Considering that mountains of such altitude, probably the two highest in the Australian continent, deserve distinctive names, I solicit his Excellency's permission to name the grandest of both Mount Hotham, and the second in height Mount Latrobe,—as I trust to be entitled to the great honour of being the first man who ever reached these commanding summits of the Australian highland. The sky being fortunately clear during the ascent of Mount Hotham, I enjoyed a most extensive and unrestricted view over the Alps, and I did not lose this opportunity of taking bearings over to some of the principal mountains already included in the trigonometrical survey of Australia. From Mount Hotham bore Mount Aberdeen (the southern peak in the Buffalo Ranges) W. 10° N., the most northern peak of the same range W. 30° N., Mount Buller W. 35° S., Mount M'Millan (of Townsend, or Castel Hill of Tyers) due S., the Cobboras mountains (between Omeo and Maneroo) E. 12° N., Mount Wellington S. 10° W., Mount Latrobe (distant about 8 miles) S. 25° E. Farther bearings were made to Mount Leichhardt E. 30° N., to Mitchell's Plateau (in about equal distance with Mount Buller) S. 40° W., to Kennedy's Height (a rocky hill in the snowy table-land, and about 6 miles distant) E. 5° S., to Hooker's Plateau (about 15 miles distant) N. 25° E. The bearings from Mount Latrobe were as follow:—Mitchell's Plateau S. 15° W., Mount Aberdeen W. 5° S., Clarke's Peak (between Mitchell's Plateau and the Buffalo Ranges) S. 30° W., Mount Hotham N. 25° W. Mounts Buller, Wellington, M'Millan, and other mountains, were concealed in clouds. I hope that these bearings, although only taken with a simple pocket-compass, will be found sufficient and correct enough to fix the position of these mountains, until an exact survey of this interesting part of the country shall be performed. The signification "Bogong Range" ought to be abandoned, as the natives apply it to any of the lofty mountains when in the fissures of the rocks, chiefly when covered with the spreading Alp pine (*Podocarpus montana*), the Bogong moth occurs. One of the main branches of the Mitta Mitta has its sources at Mount Latrobe, and those of another, as well as those of the Ovens and Mitchell, lie in a lower range not far distant. This snowy highland is in many places well grassed, and the lower parts of it will be doubtless occupied as cattle runs, as soon as the discovery of a workable gold-field opens this part of the colony. The prevailing rock is sandstone, often accompanied by slate and quartz. Granite is comparatively rare.

After extending my journeys over several mountains in the neighbourhood, and an exploration of the Upper Mitta Mitta, I went over a generally fertile country to Omeo.

The amount of additional plants for the Flora of Victoria, obtained during this part of my expedition, is nearly sixty species. Several of them are perfectly unknown, and nine of the genera and one natural order (*Asteliaceæ*) were also not represented in this colony previously.

It is my intention to proceed without delay from here to the Cobboras, thence to Maneroo and the Mungang Mountains, by which excursions the botanical examination of the Australian Alps will be completed.

2. *Extract of a Letter from the Rev. W. B. CLARKE, F.R.G.S., to the Secretary.*

St. Leonard's, N. S. Wales, June 1, 1855.

I HAVE had a conversation with Mr. Baines, the artist to the North Australian Expedition, and have recommended him to visit several places in this part of the colony, that he may be able to recognize similar formations in the N.W., and I will give him every information in my power to assist his views. I think it a pity that *two* of the party (in case of the artist's death) had not been familiar with the use of the photographic apparatus.

We have had a very unusual season, and all the phenomena indicate a *period* in the climate. The ice has reached a lower latitude than ever was known, and the sea has been blocked up with it. In 1854 I wrote a note to Captain Hall of the 'Cresus,' and also informed the Captain of the 'Lady Jocelyn' of the necessity there would be for caution respecting ice. I founded my expectations upon certain calculations from observed phenomena during long antecedent periods, and I find they were correct. Presuming upon the idea of periodical affections of the earth's general organism (a question which I took up many years since in Loudon's Mag. Nat. Hist.), I imagine the cold of your last English winter was connected with the disengagement previously of ice from the Arctic coasts, as our cold here in 1854 was, doubtless, with that of the ice from the Antarctic shores.

3. *Extract of a Letter from Capt. STURT, F.R.G.S., to Dr. SHAW.*

Cheltenham, Oct. 22.

By the last mails I received letters from Messrs. Gregory and Baines, of the North Australian Expedition, and I therefore lose no time in letting you know how the Expedition is getting on. The whole of the staff were to leave Sydney on the 15th of July for Moreton Bay, where the younger Mr. Gregory has been for some time employed organising the party and purchasing stock. Mr. Gregory writes to say that as he feared the prevalence of the poisonous herb "*Lobelia*" in the northern parts of the continent, he had decided on taking all horses, 50 in number. Two vessels convey him and his party to the Victoria, and he proposes, as I suggested, trying to penetrate into Central Western Australia, and then returning to the Victoria for fresh supplies, which, under the change, is all right. He will then cross to the Gulf of Carpentaria and try to unite his own line with that of Mitchell's Victoria; but the truth is, his movements will depend on what kind of country he may find, and we shall have intelligence of him before he commences the second portion of his journey.

I suppose the Expedition is now high up Stokes's Victoria, and we may soon learn how and with what prospects they left the coast. I shall watch their progress with intense interest, and you may depend on it I will let you know everything that I hear.

Sir R. Murchison, in referring to the interest the Society had taken in originating and promoting this Expedition, pointed out its proposed course from Moreton Bay by sea to the mouth of the Victoria River on the North-West Coast. It was intended to ascend that river to its source, and to determine the boundaries of the tract

of land whose drainage formed the rivers of North Australia. The expedition, passing eastward, would probably skirt the northern limits of Sturt's Central Desert, and reach the head waters of the streams that flow into the Gulf of Carpentaria; from thence it was hoped that it would be in a condition to penetrate southwards, to the great bend of the Barcoo River; which was the northernmost point reached by Sir Thomas Mitchell and Mr. Kennedy on their journeys from Sydney towards the Gulf of Carpentaria. These operations would greatly extend our knowledge of Northern Australia, and tend to open up communication between it and the Southern colonies.

4. *Letters from Africa, accompanied by a new Map of the Interior.*

By Dr. LIVINGSTON.

Communicated by Sir RODERICK MURCHISON.

These letters of Dr. Livingston, including his observations and map, will be found printed at length in vol. xxv. p. 217, of the forthcoming Journal of the Royal Geographical Society. A short abstract will therefore suffice:—He left the confluence of the Leeba and Leeambye, lat. $14^{\circ} 11'$ S. and long. $23^{\circ} 40'$ E., to travel to the west coast of Africa. Sekeletu, the king of that country (under whose protection he had been long exploring), furnished him with 27 men and with oxen; and Dr. Livingston proceeded by the way of Londa, whose king, Matiamvo, is well known to the Portuguese. Many flooded rivers and plains were crossed by the party, and at lat. $10^{\circ} 17'$ S. they forded the Casai River, having entered upon a new river system. The Londa country is forest land, alternating with sward. The trees are interlaced with creepers, and covered with mosses and lichens. Everything indicated a humid climate. Thence they passed to an elevated table-land, overgrown with Cape heaths and rhododendrons, and finally arrived at a sudden descent of 2000 feet, at the foot of which lay the wonderfully fertile valley of the Cassangé and the river Quango: 90 or 100 miles to the W. of this descent appeared the edge of a similar table-land, but looking in the far distance like a range of mountains. The tribes were found to alter for the worse as the Portuguese territories were approached, and heavy fines were levied on the Doctor's party upon the most frivolous pretences, but actual collision was avoided. Once within the Portuguese territories, he pays full tribute to the courtesy and kindness he experienced at the hands of the authorities and others. He arrived at Loanda labouring under severe illness, having suffered very frequently from intermittent fever. He adds that the Casai and Quango are reported by intelligent natives, who profess

knowledge of the country and who are believed by Portuguese traders, to join somewhere N. of Cassangé, and to form the Congo or Zaire of Capt. Tuckey. Dr. Livingston announced his intention of returning to the interior and of visiting King Matiamvo, and subsequently of descending to Quillimane, on the E. coast of Africa, by the Leeambye River (which, he entertains no doubt, is identical with the Zambesi). Dr. Livingston did so return, and writes from Cassangé, describing the province of Angola, through which he had then passed twice.

After some remarks from Mr. Macqueen, and a few words from Sir R. Murchison, Mr. Consul Brand, and Mr. Galton, the Meeting was adjourned till November 26.

Second Meeting, November 26, 1855.

SIR RODERICK MURCHISON, V.P., in the Chair.

George Peabody, Esq.; Captain E. G. Fanshawe, R.N.; Colonel C. G. Fagan; Dr. Christopher Elliott, M.D.; Captain E. Palmer, R.A.; the Rev. J. L. Porter, A.M.; Edward Cheshire; Edmund Gabriel, Her Majesty's Arbitrator at St. Paul de Loanda; G. F. Leslie; W. E. Shaw, R.N.; W. Spottiswoode, F.R.S.; George Milner Stephen, F.G.S.; and James Vavasseur, Esqrs., were elected Fellows.

The Papers read were—

1. *Memoir on the Map of Damascus, the Hauran, and the Mountains of Lebanon, constructed from Personal Survey.* By the Rev. J. L. PORTER, A.M.

Communicated by JOHN HOGG, Esq., M.A., F.R.S., F.R.G.S.

This paper contains the account of a great many journeys, taken by the author, in various directions through Syria, during which he made a large number of observations with rough surveying instruments, and records many gross errors which he is satisfied that he has detected in the received geography of that country. The environs of Damascus he finds to be very untruly delineated: thus the Bahr el Merj is not one single lake, but three distinct ones, and the plain surrounding the city is studded with large villages, none of which appear on the maps. Balbeck is to the eastward of N. from Damascus, and not considerably to the westward of N. The end of the Antilibanus chain requires a correction of half a degree in longitude and a quarter of a degree in latitude. The author traversed

the whole region between the Hadj road and the borders of the desert in such a way as to enable him to cover it with a network of compass bearings, embracing all the more important towns and villages; and these he connected with the well-defined summits of Hermon and Mânia.

Several minor faults in Burckhardt are pointed out, and some conclusions of M. de Sauley contended against. Allusion is made to a recent map of the Hauran by a Turkish officer of Engineers, Fezzy Bey, which was found to contain much useful matter, though not strictly accurate as a survey.

Mr. Porter conceives that the whole range of Gébel Hauran, and not the single peak of Kuleib, is the ancient Alsadamus Mons; and as the district which comprehends this mountain range is now called "Ard el Bathanyeh," and for other reasons, he considers that this province is identical with the ancient Batanea.

2. *Reports respecting Central Africa, as collected in Mambara and on the East Coast, with a new Map of the Country.* By the Rev. JAMES ERHARDT.

Communicated by the CHURCH MISSIONARY SOCIETY.

Vague reports have long since been heard by the missionaries in Eastern Africa, of lakes; of mountains, isolated and in masses; and of a country whose slope and drainage was towards the interior.

At Mombas, few opportunities offered themselves of meeting with travelled natives; but it was quite otherwise both at Faga and at Tanga. At both of these places the missionaries stayed many months, and made acquaintance with caravan leaders, Arabs, Suahelis, ivory-merchants, and slave-dealers, whose reports corrected and corroborated what had been told to them before.

There are three main sets of routes from the coast to the interior, all of which pass over a flat country, and finally lead to an immense lake of fresh water. Mr. Erhardt calls this the "Sea of Uniamesi," from the country that affords the greatest extent of its eastern shores. But the Waniamesi, the inhabitants of that country, call it "Ukerewe;" elsewhere it is called "Niandja," and its southernmost extremity "Niassa."

Very full geographical details are given in Mr. Erhardt's paper about each part of these routes. He gives us also an account of its ferries, where it is narrow, and of two voyages across it, where it is very broad; one of these is that of an Arab, who also coasted along a large part of its northern shores.

The routes are as follow, and all of them run westerly and in the directions drawn by him on the accompanying diagram-map.

1st. That of the ivory traders from Tanga, who, threading various isolated masses of hills, of which Kilimandjaro and Doenyo Engai are snow-capped, passes through the level pastoral country of Masai to a place called Burgenei. This route (taking the average of four journeys, the particulars of which are given) occupies 55 days, the rate of travel being about seven hours a day. His informants travelled 8 days farther from Burgenei, through a tract peopled densely with Waniamesi, and then came suddenly upon the lake. The Masai are fierce and pastoral, the Waniamesi kind-hearted and agricultural.

2nd. That from Mboa Maji to Ujigi, a town of Uniamesi. This is of equal length to the first route, and is travelled leisurely by numerous caravans, with horses, donkeys, &c., for slaves, ivory, and copper ore. The country passed over is perfectly level, with the exception only of a mass of hills, the Ngu, which has to be crossed about a quarter of the way from the coast.

3rd. Those from Kiloa or Kirimba, to the ferries Gnombo and Mdenga. They are travelled by Portuguese slave-dealers as well as by Arabs.

In tracing the contour of the lake, he begins from the South; he speaks of people who come up from its shores two days' journey to the southwards of the ferry Mdenga (which is stated to be due west of Wuibu), in order to cross the lake, for they know nothing of its southern termination. From Mdenga to Gnombo is 5 days—2 hard days farther to Sigono, a "heel." Here the shore of the lake makes a great *heel* and turns to the westward of North, for 7 days, when a wild elephant-country is reached. The shore now runs due west for 6 days to the Waniamesi. Among them for 12 days farther, the shores run due E. and W., and in another 12 days farther, a tribe, the Wafipa, is reached, in whose country is a small salt-water stream, of which much notice is taken and which is spoken of as running westwards from the Wafipa to the Wapogo.

A traveller from Ujigi, going due south along the shores of the lake, reached the salt river in the Wapogo country in 7 days; here, he says, the sea made "quite a round bend." This great bend is confirmed by fishermen of the Lake. From Ujigi northwards to the great river of the Wadusi, was sailed by an Arab, but detailed itineraries are wanting. A considerable portion of its southern and western shores is traced out on similar evidence.

Ujigi is the starting point for large row-boats to cross the lake to the opposite shore; in 5 days' rowing they reach a mountainous island, Kavogo. 25 more days takes them to the opposite shore,

where they buy copper. The abovementioned Arab sailed across the sea in 12 or 15 days, and was 9 days in returning.

The Lake appears to be remarkable for its low, sandy, and reedy shores, except only at its southern extremity, where it runs along the base of a steep range of hills. Its waves run very high, and an entirely calm day is rare. Its water is sweet and good, and abounds with fish; there are very few islands visible anywhere from the coast, and the abovementioned Arab, who twice crossed it, saw none. A large part of its shores teems with a population "like an ant-hill." Its northern extremity is unknown, but it may be at the foot of a range of mountains which stretch westward to the north of Burgeni. The river of the Wadusi, on the northern part of its east coast, is an enormous river, but very sluggish; the other principal tributaries which have been heard of, are laid down on the accompanying map.

Third Meeting, December 10, 1855.

REAR-ADMIRAL F. W. BEECHEY, PRESIDENT, in the Chair.

John Alger, A. Cumming, A. Gillespie, D. M'Gregor, and C. White, Esqrs., were elected Fellows.

The President stated that the Secretary had received a communication from Mr. Haidinger, of Vienna, announcing the proposed formation of a Geographical Society in Austria.

The Papers read were—

1. *Extracts from a Letter from JOHN KENT, Esq., F.R.G.S., to Dr. SHAW, dated Sydney, Aug. 12, 1855, giving information respecting the North Australian Expedition.*

"I left Moreton Bay on the 4th inst., at which time the expedition was lying at the bar of the river, waiting for the tide to proceed to sea. It consisted of Mr. A. C. Gregory and his brother, Messrs. Baines and Wilson, Mr. Elsey, the surgeon, Dr. Müller, Mr. Flood, and 14 men, with 50 horses and 200 sheep, embarked on board the 'Monarch' barque and schooner 'Tom Tough.' Mr. G. Windsor Earl is also a passenger on board the former vessel, and his experience in tropical Australia will be of great value to the expedition. The 'Monarch,' after landing the horses and stores, proceeds to Singapore, from whence you will next hear of its movements. The 'Tom Tough' is engaged to wait in attendance on the expedition so long as Mr. Gregory shall require her to do so. Provisions and stores for two years have been provided, and all Mr. Gregory has demanded supplied. The men have been engaged at 8s. per diem.

"There has been, in my opinion, one grave departure from the original plan, namely, the omission of bullocks and bullock-drays, which I hold to be essentially necessary; but Mr. Gregory acts from his experience in West Australia, setting at nought the practice of Sturt, Mitchell, Leichhardt, and former ex-

plorers. Apart from this determination, which I hold to be an error, I deem him a most competent leader for such an expedition. Spare and active in person, quiet and reserved in manner, with great firmness of purpose, he is well adapted to conciliate the Aborigines, and, what is more essential, the elements composing his own party. I think it would be difficult to find four men better adapted for undergoing fatigue than the brothers Gregory, Wilson and Baines. Of the others I cannot speak so confidently; but the patience and resignation of Dr. Müller have been tested by a seat for three days up a gum-tree, waiting the subsidence of a flood. He is a German botanical enthusiast, which will account for this incident in his experience.

"Authentic information has been received within a few weeks, which sets at rest the question of Leichhardt being alive. Several mules have been found which belonged to the party, and the remains of pack-saddles, broken and destroyed by the natives. There is no doubt, therefore, that he and his party have been cut off by the natives."

Sir Roderick Murchison, recapitulating what he had stated on previous occurrences, reminded the Meeting of the origin of this Expedition, as suggested by the Royal Geographical Society, and of the deep interest taken in it by the Duke of Newcastle, its first patron. He congratulated those who had united with himself in originating it, on the safe arrival and prosperous landing of the party under the able conduct of Mr. Gregory; and felt assured that every member of the expedition, as well as his geological correspondent, Mr. Wilson, was well qualified to perform the arduous task set before them, and the plan of which had been so ably matured by Captain Sturt.

2. *A Communication from EDMUND GABRIEL, Esq., Her Majesty's Arbitrator at Loanda, to the EARL of CLARENDON.*

Transmitted to the Society by Lord WODEHOUSE.

A letter to the same effect, dated August 28, had also been received through Consul Brand, announcing the receipt of a letter from Dr. Livingston, describing his further progress in the interior after leaving Cassangé. Dr. Livingston crossed the boundary of the province on the 18th of May last, intending to visit Matiamvo, the paramount chief of the Londa country, and to ascertain if the river Casai be navigable there. After crossing the river Chikapa and the river Maomba he arrived at Cobango, a large trading station on the river Chihombo, from whence Matiamovo is 100 miles E.N.E. At this place Dr. Livingston's native companions expressed an anxious wish to turn south towards their homes on the Leeambye; and circumstances rendered it necessary to adopt that course.

3. *Notes on the Geography of Central Africa from the researches of Livingston, Monteiro, Garcia, and other authorities.* By JAMES MACQUEEN, Esq., F.R.G.S.

Mr. Macqueen called in question the conclusions of Mr. Erhardt.

In Mr. Macqueen's paper, of which only a small portion was read, he contended that there were two lakes, and not a single large one; that there was a general slope of Africa from the interior towards the coast of Zanzibar; that the river crossed by Dr. Livingston, and called by him the Casai or Cassabe, was not, as he had heard, an affluent of the Congo, but that it was identical with the Cassabe River, which joined with the Lualaba River and ran into the northernmost lake. That a river issued on the opposite side of this lake, and reached the sea under the name of the Lufia, or the Lufigi; that the Luapula River, passing near to Luenda, ran between the two lakes without touching either, and then joined the Lufia; and, finally, that the northernmost lake and the southernmost were distinguished by the names of the Greater and the Lesser Niandja.

Mr. Erhardt premised that, during his residence of six years on the coast, he had become familiarly acquainted with three of the native languages, and had derived his information from a vast number of persons, and from independent sources. He then recapitulated the conclusions he had arrived at, based on the evidence mentioned in his paper read at the last Meeting:—

That a ridge of considerable elevation, but not quite continuous, runs from N. to S., at no great distance from the coast, and forms the watershed of that part of Africa.

That the region to the E. of this ridge is drained by several short streams, *e.g.* the *Rufu*, rising in the *Faga* country; the *Rufuma*, and others.

That he himself had ascended the *Lufigi* river for a few miles, and found it to be a small and insignificant stream. Mr. Macqueen's description of its length and breadth corresponded to no river at all in East Africa.

That the country W. of this ridge consists of extensive plains with isolated hills, the plains being for the most part level, and presenting from the heights the appearance of a vast sea.

That beyond these there is an immense lake or inland sea, of which only the approximate size can be given, since the measurements are determined exclusively by the journeys made by natives along parts of its shores and across it. Only the E. and part of the S. coasts can be laid down with anything like an approach to accuracy.

He then mentioned the reports of natives and traders which con-

nected different points in succession along the entire margin of this Lake, and asserted that he was well acquainted with the names given by Mr. Macqueen, and ascribed by him to different lakes, but that they simply referred to two reaches at the very southernmost extremity of the same lake: the lesser one, which ran N. and S., being usually ferried across by traders; and the greater one, running E. by W., seldom if ever crossed by them, because of its greater breadth, and because the direct routes of the caravans ran alongside of it.

4. *Geographical Notes on Siam, with a new map of the lower part of the Menam River.* By HARRY PARKES, F.R.G.S., H.B.M.'s Consul at Amoy.

Mr. Parkes commenced by alluding to the treaty lately concluded by Sir John Bowring with Siam, which has brought that country into prominent notice, and entered at length into the history, political divisions, and geography of Siam. For the map which accompanied the description he was indebted to the kindness of Dr. S. R. House and his colleagues of the United States mission.

The kingdom of Siam may be described generally as lying between 5° and 21° N. lat. and 98° and 105° E. long., but its eastern boundary is almost entirely unknown. It comprises—

1. Siam proper, divided into 41 provinces, each governed by a mandarin of the first class.

2. Tributary Malayan States on the south, whose submission is rather loose, and consists in sending an embassy once in three years to the Siamese Court with a tribute composed of a gold or silver tree, and in being bound to furnish men, money, and provisions when Siam is at war.

3. Conquered territory of Camboja and Korat on the east.

4. Tributary Lao states on the north and north-east.

Camboja, three or four centuries ago, was much more powerful than either Siam or Cochin China, but it has gradually been encroached upon, so that it is now reduced to a mere shadow of its former greatness, containing only half a million of inhabitants, while the son of their king is a hostage at Bangkok, and the Cochin Chinese possess the exclusive navigation of the river of Camboja, the Mekong.

The Lao states furnish a very interesting people, whose ancestors appear to have formed the parent stock of the Siamese. Thus, the Laos call themselves the "Elder *Tai*," and the Siamese the "Younger *Tai*." *Lao* is a Chinese word, and means "*Ancient*." When the Siamese separated themselves from the Laos, they became a tributary province to Camboja.

Mr. Parkes notices especially two of the Laos races, viz. the *white-bellied* Laos, who do not tattoo; and the *black-bellied* Laos, so called because they tattoo themselves with figures of tigers, dragons, and all kinds of monsters.

The rivers are the highways in many parts of Siam, and canals are very numerous in the S. portion. A large part of the country is inundated in the wet season, and then boats do not confine themselves to the canals, but sail over the rice-fields. The productions of Siam are very various, but the chief are rice, indigo, maize, sugar, cotton, pepper, lac, gums, &c.

Bangkok, the capital, is situated on the lower part of the river. The houses are mostly built of teak, and the temples are very numerous. Several of them are very large, containing from 50 to 100 priests in each. Ayuttaya, the former capital, was situated on an island in 14° 20' N. lat., which it entirely covered. There were formerly many colossal idols here, the cost of which may be estimated when it is stated that 25,000 lbs. of copper, a large quantity of silver, and 400 lbs. of gold were consumed in making one idol. The modern town contains floating houses, like those at Bangkok. The population of Bangkok is variously estimated at from 350,000 to 400,000, and of these about one-third are Chinese. The city extends about 7 miles along both banks, having a breadth almost as great in one part. There are walls round portions of it, 30 feet high and 10 feet thick. Its temples are covered with coloured tiles, and are profusely gilded. Fruit-trees may be seen in every direction. The floating houses extend some distance from the banks of the stream.

Mr. Crawford expressed his satisfaction at the notes Mr. Parkes had put together. He said that a large part of Siam was a mere wilderness, and that not more than one-fifth of the whole territory was cultivated. The inundations referred to by Mr. Parkes might be very well compared to those of the Ganges; except that in the case of the Menàm the lower valley was not inundated more than 10 leagues counting from the sea, as the ground was high. Bangkok, the capital, stood on this high ground. The bar at the mouth of the Menàm was 10 miles broad, having 2 feet of water upon it at low water, and 14 feet at high water. The climate of Siam was very good, and that of the S. part extremely healthy. Siam is emphatically a sugar producing country; it is also the only country that produces *gambooge*, which derives its name from Camboja. Some kinds of fruit which grow here luxuriantly can scarcely be grown in any other part of Asia.

Mr. Simmonds, in confirmation of what Mr. Crawford had just stated, said that in 1845 no less than 340,000 cwt. of sugar were exported. The list of valuable products of Siam might be very

greatly extended, as the *raw produce* from the extensive forests of Siam is very great. He would mention especially gum benzoin and *lac*. He regretted to find that the Americans had been before us in the trade with Siam.

In answer to a question put by him, Mr. Parkes stated that according to the treaty with the King of Siam, the British may travel and trade throughout the country, but they may only settle and purchase land for the distance of 54 miles round Bangkok. English ships enter the rivers on the same standing as native craft. The free use of the Christian religion is allowed, together with churches, cemeteries, &c. The former heavy measurement duty is abolished, and one of 3 per cent. on imported goods and 6 or 7 per cent. on exported is substituted. Thus there is every reason to believe that the trade which under the former oppressive duties reached half a million sterling, may yield several millions annually.

The Meeting was then adjourned till January 14, 1856.

Fourth Meeting, January 14, 1856.

REAR-ADMIRAL F. W. BEECHEY, PRESIDENT, in the Chair.

Sir Thomas Fremantle, Bart.; John Bowman; Alexander Gordon, C.E.; J. W. Gordon, F.S.A.; H. S. Montagu, and John Phillips, Esqrs., were elected Fellows.

The Papers read were—

1. *Translation of Three Letters from Dr. Vogel, addressed to Dr. Barth.*

Communicated by the FOREIGN OFFICE.

The first letter was dated Jan. 30, 1855, from Gugeba, a town of about 3000 inhabitants; the second, Feb. 16th, from Yakoba; and some of the information they contain has already been published. In them he announces the following provisional determinations of latitudes and longitudes. The former of these may be depended on to 2 minutes, and the latter to 5 minutes. He mentions that a great many observations have been taken, but that they are not yet worked out.

	Lat. N.	Long. E. Green.	Mag. Var.
Yakoba, capital of Bautshi ..	10° 17' 30"	9° 28' 0"	
Gujeba	11 29 40	11 39 0	15° 14' W.
Gabbei, frontier town of Bornou	11 4 10	11 20 0	
Gombé, a town the size of Kuka	10 49 0	10 16 0	

Dr. Vogel bears a high tribute to the accuracy of Dr. Barth's rating.

The third letter contains more recent accounts; it is dated Gombé, June 5, 1855. Dr. Vogel and Maguire had both been very unwell in the neighbourhood of Yakoba, a town larger than East and West

Kuka together, situated on a rocky plateau in a bare and stony district. He had thence endeavoured to penetrate to Adamaua, and in doing so crossed the Benue at the point where the steamer had anchored; of which fact "numberless empty pickle-jars and brandy-bottles gave unmistakeable proof." Next he arrived at Tindang, where the accident of a pack-horse being hurt fortunately prevented him joining a party of 50, who endeavoured to force the road to Yola, which had been stopped by the Bashama. All but two of these were killed the same day. Thence he returned to Gombé. He has left letters, in case another steamer should be despatched up the Tshadda.

At the request of the President Sir R. Murchison introduced to the Meeting a proposal of Dr. Baikie's to extend discovery up the Niger and Chadda. He said that, being as zealous as ever in the cause of African discovery, it gave him pleasure to be the means of bringing a proposal before the Society which embraced not only the extension of commerce, but of Christian philanthropy and of scientific knowledge. It was believed that the powerful Sultan of Sakatoo, whose influence extended over all the Fellatah tribes, would give his cordial assistance to an annual or triennial expedition sent for these purposes, and that, if recommended by the Society, Her Majesty's Government, and especially Lord Clarendon, would, it was hoped, countenance and support it.

2. *Abstract of a Letter from Lieutenant Maury, U.S.N. Observatory, Washington, December 3rd, 1855, addressed to the President.*

Lieutenant Maury encloses a tracing of the track of the U.S.S. 'Vincennes,' under Commodore John Rogers, commanding the surveying expedition to the North Pacific Ocean. That officer states that he visited and ascended Herald Island in 1854, and thence sailed either over or in the immediate neighbourhood of several localities where land had been reported to be seen, but without finding any. Of these he specifies as follows,—that, by Captain Kellet, to the eastward and in the neighbourhood of Herald Island, the northern portion of that land mentioned in Arctic Papers 1847-51, p. 41; and the so-called Plover Islands; also that land which has been reported by Admiral Wrangel on native authority to lie to the N. of Cape Jakan.

Full official reports are expected from the Commodore, who is now at San Francisco.

The President remarked that Captain Kellett had not spoken of an island, but of appearance of land.

3. Dr. E. K. KANE'S *Report to the Secretary of the United States Navy on his search for Sir John Franklin during the years 1852-3-4, accompanied by a Chart, showing the Discoveries made during the course of that Expedition.*

Communicated by the ADMIRALTY.

Dr. Kane left New York on May 30, 1850, in the brig 'Advance,' of 120 tons burden. His company amounted to 18 persons, 10 of whom belonged to the United States navy, and his destination was the highest point attainable through the northward of Baffin Bay in search of Franklin. He reached Cape York ten days after meeting the ice, and passed on August 7 the headland of Smith Sound, and the highest point attained by Capt. Inglefield, R.N., in 1852. Open water lay before him, but a belt of heavy stream ice was soon reached, which was followed by a drifting pack that obstructed the channel. He attempted to push through the pack to the northward, but at lat. $78^{\circ} 45'$ the drifting ice drove him on the Greenland Coast, where he was detained in Refuge Inlet for three days. By a great effort, and taking advantage of openings caused by the tides, he forced a passage to lat. $78^{\circ} 43'$, which was reached on August 29. On the same day Dr. Kane left the ship in charge of Mr. Olsen, and started with boat and sledge to select a spot for wintering. The boat and sledge were successively abandoned, but the work was done. From a cape at an elevation of 1100 feet, a black ridge, subsequently found to be a glacier, was seen terminating the view along the Greenland coast to the eastward. Icebergs crowded the channel, and a frozen sea extended to the range of vision. Winter quarters were selected at Van Rensselaer Harbour near a group of rocky islets in the south-eastern curve of a bay, where the brig was frozen in on September 10. Parties were organized for establishing provision depôts to facilitate researches in the spring, and more than 800 miles were traversed. The Greenland coast was traced for 125 miles to the north and east, and the largest of the three depôts along the coast was formed on an island in lat. $79^{\circ} 12' 6''$, and long. $65^{\circ} 25'$. Darkness arrested these proceedings on November 20, and the sun continued 120 days below the horizon.

An observatory was erected adjacent to the ship, and a thermal register was kept hourly. The mean annual temperature at this spot appears to be 2° lower than that of Melville Island, according to Parry. The lowest temperature was observed in February, when the mean of eight instruments gave -70° Fahrenheit. Chloroform froze, essential oils became partly solid and liquid, and on February 24 chloric ether was congealed for the first time by natural temperature. For astronomical observations, a transit and theodolite were

mounted on stone pedestals cemented by ice. The longitude was based on moon culminations, corroborated by occultations of planets and the solar eclipse of May, 1855. The position of the observatory was found to be in lat. $78^{\circ} 37'$ and long. $70^{\circ} 40' 6''$. Magnetic observations, both absolute and relative, were also kept up.

Spasmodic disease occasioned the chief difficulty, but scurvy was completely subjugated. In the form of tetanus, the spasms attacked the dogs, and 57 died, with symptoms not unlike hydrophobia. The loss of these animals seriously affected Dr. Kane's plans; new arrangements had to be formed, which, owing to the smallness of the party, now deprived of dogs, were necessarily restricted.

A passage to the north over the distorted ice, crowded with bergs, was resolved on. A party sent in advance under Mr. Brooks endured great suffering, and barely escaped with the loss of two lives. Another effort in the same direction was made under Dr. Kane's personal guidance during April and May, and journeys by other parties were carried on till July 10. The addition of four dogs, contributed by Esquimaux, permitted the operations to be considerably extended. Out of nearly 3000 miles traversed, no less than 1100 were made with the dog-sledge; and during the following year, 1854-55, Dr. Kane himself travelled 1400 miles with a single team.

Three expeditions crossed the bay. The great glacier in lat. $79^{\circ} 12'$ was surveyed by Dr. Kane in 1855. Another party went to the S.W.; and the shores of the new channel northward were explored by the third. Open waters washed the shores of the channel and terminated in a sea, the heavy surf of which checked farther progress.

The farthest point attained is a precipitous headland, named Cape Independence, in lat. $81^{\circ} 22' N.$, and long. $65^{\circ} 35' W.$ From it the Western Coast was seen stretching to the north with an iceless horizon and a heavy swell rolling on with white caps. Two islands on the eastern threshold of this sea have been named after our lost countrymen, Sir John Franklin and his companion, Captain Crozier. On the west, the coast was observed to be mountainous, and the farthest distinctly sighted point was a lofty mountain, bearing $N. 5^{\circ} E.$ (solar), estimated to be in lat. $82^{\circ} 30'$, and long. $66^{\circ} W.$ (approximate), which Dr. Kane proposes to name after Sir Edward Parry, who, he says, "as he has carried his name to the most northern latitude yet reached, should have in this, the highest known northern land, a recognition of his pre-eminent position among Arctic explorers."

The winter of 1854 passed with many trials, and in the following summer it became necessary to abandon the brig and retreat. On May 17, Dr. Kane commenced his return in sledge boats; on

August 6, in 83 days after leaving the ship, through many perils and escapes, he arrived at Upernavik, where the Danish authorities gave them a cordial welcome.

The President said that the small vessel in which Dr. Kane sailed brought to mind the voyages of Hudson, Baffin, and other Arctic worthies; and he praised the unostentatious tone of Dr. Kane's report, which touched upon hardships more with reference to those under him than to himself.

He then pointed out the peculiar difficulties and sufferings of the expedition owing to the appearance of tetanus—a complaint almost unheard of in Arctic travel—which had carried off some of the men, and almost all the dogs.

He acknowledged the impartiality with which Dr. Kane had named the farthest points of discovery—which might be called the posts of honour—without national distinction; and said that the zeal and ability displayed in the conduct of the expedition, and the generosity with which Dr. Kane bestowed the praise due to it, upon those associated with him, did credit alike to his head and his heart, and must endear the man himself to all who had, that night, heard the account of his proceedings.

Sir E. Belcher said that, on 17th May, from an elevation of 1500 feet, he had seen the sea open to the distant horizon, or as far as the eye could see, studded with small loose ice, and had no doubt that this was the same icy sea seen in motion by Parry and Kane.

Captain Sherard Osborn having made some observations upon the relics of Franklin's expedition;—

Dr. Rae agreed in the main with Captain Osborn, but wished to remark that the descriptions given by the Esquimaux were distinct and clear.

In the spring of 1850, a party, of at least 40 in number, had been met N. of King William Land, who, travelling southwards, had pitched tents to rest in, and were found dead on a low flat country near Point Ogle. Mr. Anderson had found, on Montreal Island, part of a boat marked "Terror," and the valuables obtained by him were similar to those saved by Sir J. Ross. The account of the Esquimaux was no doubt true in all material points.

He thought Dr. Kane's party would have suffered less had they built snow-houses as he had done, instead of using tents when travelling; he had only two blankets and two skins for every four men, and scarcely suffered from cold. A difference of 15° or 20° in the external temperature made little difference in a snow-house. The position of the ships was supposed to be between Victoria Land and N. Somerset.

The President said he had not wished to bring on a discussion on points which would naturally be raised at the next Meeting, and remarked on the confirmation by Dr. Rae of some of the discoveries of Captain Inglefield.

Colonel Sabine referred to the remarkable facts mentioned by Dr. Kane of the great variations of temperature in places in immediate proximity in the Arctic regions, and concluded from this, and from similar facts observed in other parts of the Arctic regions, that in the high latitudes local temperature and productions were dependent on local influences rather than latitude.

Captain Washington said : In common with all interested in Arctic discovery, I beg to express my admiration of the indomitable perseverance and the unflinching courage, under difficulties of no ordinary character, that have been exhibited by Dr. Kane and his gallant crew in the expedition of which we have heard an account this evening; and when we consider that these labours and privations were undergone in the sacred cause of humanity, in the search after our missing countrymen, I feel it difficult to find words to convey my heartfelt appreciation of their heroic exertions and their patient endurance. In answer to a remark of the President as to my opinion with respect to an open Polar Sea, I should not have ventured, in the presence of so many experienced Arctic navigators who are assembled in this hall, to express any opinion on the subject; but as the question has been put to me, I must not shrink from stating my conviction that every fresh fact is in favour of such a theory. Barentz in 1597, and two centuries and a half later Wrangel, found open sea off Siberia, and Parry off Spitzbergen; Penny and Belcher report the same appearance in Victoria Channel; and now Dr. Kane adds his testimony to the rest. It is difficult to resist the weight of such evidence.

Captain Ommanney and Lord Ellesmere having expressed their admiration of the manner in which Dr. Kane had conducted the Expedition, the Meeting broke up.

Fifth Meeting, January 28, 1856.

REAR-ADMIRAL F. W. BEECHEY, PRESIDENT, in the Chair.

The Marquis of Lansdowne, K.G.; Major Vincent Eyre; F. Dillon Croker; John Anthony Rucker; W. F. de Gex; and H. R. Williams, Esqrs., were elected Fellows.

The Papers read were—

1. *Copy of a Letter from Chief Factor JAMES ANDERSON to Sir GEORGE SIMPSON, Governor-in-Chief of Rupert Land, dated Fort Resolution, September 17, 1855.*

Communicated by the HUDSON BAY COMPANY.

After enumerating the almost insurmountable difficulties experienced during the journey, owing to the ice and other obstructions, and giving an account of the twenty-five portages over which the expedition had to pass, Mr. Anderson announced that his party had reached Montreal Island, in the neighbourhood of which undoubted traces of Franklin's people had been found, namely, tin oval boilers, bars of iron, chain-hooks, an iron shovel, and other articles in the possession of the Esquimaux. He also learnt by signs, that they had belonged to white men who had arrived with a boat, and who had died of starvation. He could find no traces of papers or books. At another place some pieces of wood were found, on one of which was cut "Stanley, surgeon of Erebus." Some chips were also discovered, on one of which was the word *Terror*. There was no Esquimaux interpreter in Mr. Anderson's party.

The region visited is described as most inhospitable; there is no wood; few or no deer pass by; while wind and rain are almost constant: so that in the opinion of the author no party could possibly pass a winter there, and any papers or books would speedily be destroyed by the weather or ice.

In reply to a question from the Chair as to the cause of Mr. Anderson being without an interpreter, Dr. Rae explained that the interpreter had been left by him in 1854 at Fort Churchill, and was retained there in the pay of the Company, but in the winter, longing to see his friends, he left, and did not return in time for the express. An old man was sent in his place, but the difficulties of the journey prevented his reaching the expedition, and no other could be obtained.

2. *A Paper "On the probable Course pursued by Sir John Franklin's Expedition."* By A. G. FINDLAY, F.R.G.S.

Allusion was made to a former paper read by him before the British Association, which showed that there was a constant circulation of the ocean-water around the Arctic basin, which, passing out by Baffin Bay, kept up a perfect system of compensation. This current

from the N.W. will drift out any floating bodies in some form, or at some period, or they must be driven by the ice on to the shores. As no remains of wreck or other evidences of the existence of the 'Erebus' and 'Terror' have been met with in the widely-extended search, it may be argued that the first of these events has occurred.

The first evidences of the route pursued by Sir John Franklin were those given by the pieces of a boat's fittings found by Dr. Rae on the S.E. coast of Wollaston Land, Aug. 21, 1851; these were at the head of the flood-tide coming from the N.E. In April of the same year, after the discovery of the winter-quarters of 1845-6, numerous small pieces of wood, &c., were found by Capt. Penny up the Wellington Channel: these it was shown may have come from the S., and therefore do not give so clear an indication. Allusion was then made to the Esquimaux report and sketch brought from Pond Bay, June, 1849, describing four ships near Prince Regent's Inlet, two of which were Sir James Ross's, in Port Leopold, and the other two, to the *westward*, were considered to be the 'Erebus' and 'Terror.'

There is no evidence whatever to show how the interval was passed between the ships leaving Beechey Island in 1846 (perhaps in or after September), and the autumn or winter of 1849, when the boats' crews found their way to the north shore of King William Land, down the Victoria Strait of Rae, and in the spring of 1850, when they reached the mouth of the Back River, where the last sad consummation took place. It was contended that the only indications met with are those of *boats*, and therefore that the ships were deserted to the westward of Peel Sound. For had they passed to the eastward of that part, the retreating party would have passed down Prince Regent Inlet to have availed themselves of the depôt of provisions on Fury Beach, on its west side, found still untouched by Kennedy and Bellot in 1851. By what route the 'Erebus' and 'Terror' arrived at this point is all open to conjecture. They may have passed up the Wellington Channel to the N.W., and then southward down the Byam Martin Channel, and thus arrived at the same spot attained by Capt. Kellett in the 'Resolute' in 1853; or they may have gone to the W. and S.W. past Cape Walker, as the original instructions directed, and by either route become inextricably entangled in the field-ice of Melville Sound. The fate of the ships was then referred to those seen on an ice-floe on the north side of the Banks of Newfoundland on April 20, 1851. The perfect consistency of the evidence, zealously collected, which has never been contradicted or shaken in the slightest degree by any subsequent testimony, leads to the irresistible conclusion that the report is correct. If so, there is no other recorded loss of ships to which they can be referred. The description given exactly agrees with the 'Erebus' and 'Terror.'

The possibility of their being those ships was demonstrated by numerous parallel cases of the drifting of vessels. Of these several cases were cited, as occurring between 1777 and 1836; after that, the particulars of the drift of Sir James Ross in 1849, and especially of the American vessels under Capt. De Haven, from September, 1850, to June, 1851; and the drift of H.M.S. 'Resolute,' abandoned in May, 1854, and found in October, 1855, were gone into. A calculation was made from the data afforded by these, that the two abandoned ships seen on the Newfoundland Banks would pass down Barrow Strait and Lancaster Sound after Sir James Ross left in 1849, and before the Austin squadron arrived there in 1850, a period exactly agreeing with the appearance of the survivors on Point Ogle and Montreal Island in the spring of 1850. The progress of the Franklin Expedition may thus be briefly summed up:—They left the Orkney Islands June 4, 1845; their last letters sent from Godhavn on the W. coast of Greenland, July 11, 1845; were last seen in the middle of Baffin Bay, July 26, 1845. They wintered at Beechey Island, and when the ice broke up in 1846, went either northwards or westward, which of the two cannot now be decided, and ultimately became imbedded, and probably crushed, as stated to Dr. Rae, by the ice in Melville Sound, from whence, slowly drifting eastward, in the autumn or winter of 1849 they dismantled the ships and took to their boats, passing down Peel Sound and Victoria Strait, and found their last resting-place at the mouth of the Back River, where their relics were found in 1854 by Dr. Rae, and in 1855 by Messrs. Anderson and Stewart. The abandoned ships, borne along by the constant circulating current-system, imbedded in the heaped-up ice, ultimately reached the Bank of Newfoundland, and, being crushed, were, as soon as liberated by the thaw, waterlogged, and sunk directly. No traces will ever be found to show how the dreary period between 1846 and 1849-50 was passed, unless at some future period any of their journals or papers may be recovered.

The President having remarked on the numerous subjects of interest opened by Mr. Findlay's paper, said he hoped Captain Collinson would favour the Meeting with his opinion on the probable site of the loss of Sir J. Franklin.

Captain Collinson said he thought the paper just read threw much light on the subject, and, on the whole, agreed with Mr. Findlay; he thought the evidence strong that boats had reached the American shore; and that the search should be continued, on account of those who had lost their lives in solving this geographical problem, and of our national honour, which would be stained if their relics were discovered by another nation. The search might, by means of the provisions now deposited on the shores of the Polar Sea, and by our experience, be prosecuted without risk to life; and the value of the

documents to be recovered ought to be placed before the public, together with the fact that the position where to search was clearly indicated. It would give him pleasure to see the point reached by the 'Enterprise' passed by others, so that we might maintain the position our ancestors had won.

Sir G. Back said he had been sent for by the Duke of Northumberland respecting the ships said to have been seen on the iceberg. After careful consideration, it seemed uncertain whether they were ships, although the description corresponded with that of the 'Erebus' and 'Terror.' He then described the drift of the latter ship when under his command. She was cradled on the ice for four months; had at one time twenty-four feet of ice under her; was apparently released, first by revulsion of the floe, and again by contact with other ice, but was afterwards thrown on her beam ends by the uprising of a piece of ice attached to the keel; the ship was a wreck, and only kept together by being wrapped round with chain. These facts would show that a vessel drifting so far might not always remain on the same piece of ice, and he concluded that if a ship were again forced on a floe she must be injured, and if injured her fate must be doubtful. He thought the improbability was great of vessels getting so far, and that they should not have been seen by whalers or vessels crossing the Atlantic was still more surprising, and concluded by expressing his admiration of the manner in which Mr. Anderson had conducted his expedition.

In answer to questions from the Chair, he added that although he did not see the probability of sending out another expedition, he wished that the space between Osborn's and Winniett's farthest could have been examined, as well as that between Rae's farthest and Peel Strait. With respect to the preservation of papers, &c., he would only remark that the sails of the 'Resolute' became so rotten in seventeen months that the sailors could put their fingers through them.

Sir E. Belcher said his experience militated against any outlet from Parry's Sound. The drift was found, both by Parry and Kellett, to be southerly. He thought it impossible that any vessel having been out three years, and subject to its influence, could get past Cape Walker; none of the expeditions had found the sea there unfrozen, and the locality was visited by the expedition under Captain Austin as well as by himself: moreover, the stream sets through Wellington and Byam Martin Channels to the S.E. part of Cape Walker, and the same current taking Sir James Ross's vessels, had forced them to *windward* against a N.E. gale no less than forty miles in twenty-four hours. The mouth of Peel Sound had been well examined by Lieut. Browne and Sir James Ross; and if the boats from deserted ships had touched on either side, some traces would have been found. The discovery of the shovel belonging, as

he supposed, to the ship's forge, convinced him that the ship itself could not be far off, and therefore he had changed his former opinion that the expedition went down Prince Regent's Inlet, and concluded that one vessel at least must be near the mouth of Back River.

He thought the author of the paper had not taken the changes of the seasons sufficiently into consideration; his hypothesis involved an open season. In some cases the ice had been known to travel north; portions of the 'Breadalbane' transport, nipped to the eastward of Beechey Island on the 22nd of August, were found alongside of the 'Assistance,' 52 miles N. of Beechey Island, on the 5th of September, and the ice had travelled as far as Hamilton Island. The effect of the main current was to force some things up Wellington Channel and press others on the E. shore. He thought the diagram proved the vessels were not the 'Erebus' and 'Terror;' he felt sure the spars would not have been left standing, and indeed he had private information before leaving England that he need not make search for those vessels on the banks. Icebergs, when they got on the tail of the banks, under the influence of increased temperature, would expand and explode, turn into sludge, and soon disappear.

Dr. Rae differed from Sir E. Belcher. He believed that the ships had been abandoned to the N. of Back River, although the natives had not seen them, and saw no reason to doubt the information given by the Esquimaux; thirty of them had been questioned; they pointed out the place where Sir J. Ross had wintered, and near the N. point of King William Land as the spot where they saw the party dragging sledges and boat; that they had afterwards followed their tracks to the W. of an island that lay to the N. of a large river, where they had turned to the rising sun between the shore and the island, towards the mouth of the river, on low flat ground: there they had found bodies, and a boat turned over, painted white,—and one or two tents; and thought that some had lived until the wild fowl appeared. These Esquimaux he had known in 1846-7. They had also found books which had been given to the children, and torn up by them. One leaf had been preserved, and was now in Greenwich Hospital with the other relics.

The truth or falsehood of Esquimaux stories was easily to be ascertained by cross-examination. Their knowledge of the geography of their country had been remarked by every one. Of this he would give two instances. The country he (Dr. Rae) had surveyed had been accurately described to Sir E. Parry when 300 miles off, and on his return to Repulse Bay they had described to him the position of caches opened by him at nearly as great a distance from that place, which he knew to be the same from their contents and appearance.

Captain Collinson said, with reference to the hope of finding documents, that Sir J. Ross had found a MS. note-book, written by

himself in pencil at Fury Beach, when he returned there with his uncle after eight years' absence, unhurt in the pocket of the tent where he had left it.

Sir E. Belcher added that portions of the papers left by Sir J. Franklin in 1846, were found by him in 1850 quite legible, though they had been exposed to the weather.

He then explained that the Northern Sea, of which he had spoken at the last Meeting, was not to be confounded with Mr. Petermann's Polynia. The sea along the northern lands was always in motion, and therefore ice would pass along the shore.

With reference to the shovel found, he remarked that all H.M.'s ships were provided with the customary shovels with wooden handles, which would invariably be used in sledge travel. The iron blacksmith's shovel was not only too small in the blade to be useful, but the iron handle would invariably bite the hands.

Sir R. Murchison was glad to see that, though there was so much difference between Arctic travellers, yet that all who had taken part in the discussion had openly or tacitly agreed that a small expedition ought to be fitted out to follow up the clue which had been obtained. Sir G. Back was, at least, willing to allow that a more extended search would have been more satisfactory. Capt. Collinson, who had trended the whole of the North American coast from Behring's Strait to within a short distance of the mouth of the Back River, stated that a search by this line could be accomplished without risk and with an almost perfect certainty of success in a small screw-vessel, and was very decided in favour of a further search. Sir E. Belcher, adverting to the heavy utensils which the survivors of the Franklin Expedition had brought with them, had expressed it as his belief that the remains of the ships were probably not very distant from the mouth of the Back River. Dr. Rae had first given us the clue, and he (Sir R. Murchison) maintained that it would be inglorious on the part of Britain, possessing such a clue and the opinions of such experienced men, to abandon this one small and final effort. He then read extracts from a letter from Capt. Sherard Osborn, expressing his conviction that the ships were still in the ice; that the search should not be discontinued; and that many competent naval men would be happy to serve in the expedition.

Dr. Hodgkin said that long attention to the subject had convinced him of the accuracy of the opinion several years since published by Dr. R. King, that, comparing the results obtained with the expenditure of life and property, the land expeditions of moderate size very far surpassed the ship expeditions, but that of these the employment of strong small screw steamers appeared to have the preference.

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1856.

Eighth Meeting, April 14, 1856.

REAR-ADMIRAL F. W. BEECHEY, President, in the Chair.

Mr. James Hogg, Jun., was elected a Fellow.

ANNOUNCEMENTS.—The PRESIDENT announced the appointment of Mr. Andrés Poey as director of the Meteorological Observatory at the Havanna, and read a letter from Mr. Frere on the progress of Mr. Hahn. Mr. Hahn, the Rhenish missionary, had left Cape Town for Walfisch Bay, with the intention of proceeding thence, overland, to Mossamedes. Letters had been written to the Portuguese governor of that province, recommending Mr. Hahn to his Excellency's care and protection.

MR. GALTON remarked that the embouchure of that river, which forms the northern boundary of the Ovampo, had recently been explored; and it was Mr. Hahn's desire to settle near it, and thence to make such expeditions along its course as might be found practicable. This river appears to offer the shortest and healthiest high road to the interior, the whole coast on either side of its mouth being entirely free from fever. Mr. Hahn had been a missionary among the Damaras and Namaquas for about ten years, and there is perhaps no one person in South-West Africa, who has had more personal influence over the natives, or who has done more to repress their barbarous outbreaks than he.

DR. HODGKIN announced the death of Philip Schönlein, Ph. Dr., the only son of the physician to the King of Prussia, one of the most distinguished Professors of Medicine in Europe. The young man was devoted to travel; his chief object was to explore the eastern part of Africa, but having come to this country to further this object, he thought it might be well to take advantage of an opportunity which arose of visiting the West coast. He therefore went to Cape Palmas, a colony of the Maryland Colonization Society, where he died on the 8th of January of the present year. He had been there a few months, and has sent an interesting account of the state of the colony.

The Papers read were—

1. *Letter from Dr. SUTHERLAND to the Secretary.*

DR. SUTHERLAND remarks that he had visited the whole district of Natal while employed as Government geologist; that he has for ten months been fulfilling the duties of surveyor-general; that the S. W.

boundary of the district is about to be surveyed, and that the N. W. is under consideration. He has established three meteorological stations, and is engaged in forming two others, and he relates some of the many inquiries in which he has found time to occupy himself. "There are few ridges in Natal on which the mountain barometer, lent me by the Society, has not been read in connection with geological sections and astronomical observations; but, alas! it has been my fate hitherto only to look at a pile of unfinished work and unreduced data, which are every day on the increase."

SIR RODERICK MURCHISON referred to the excellent qualifications of Dr. Sutherland for the office of Surveyor-General of Natal, which he now holds in the place of the late Dr. Stanger, of the Niger Expedition; having been appointed to that post by Sir W. Molesworth on his, Sir R. Murchison's, recommendation. Dr. Sutherland is well known to geographers through his voyages and his work on the Arctic regions. Much may be expected from his researches, and there can be no doubt that he will effectively develop the very remarkable natural features and products of the region in which he is now placed.

2. *Letter from Mr. GABRIEL, H.B.M. Arbitrator at Loanda, reporting the Progress of Dr. Livingston.*

Communicated by the Earl of CLARENDON.

"I HAVE just received a letter from Dr. Livingston, dated the 12th of August last, announcing his safe arrival at Naliek, in the Borotsé country, distant from this place about 800 miles, and, according to the map which he was good enough to give me, showing his route from the Zambesi to Loanda, lying in latitude about $14^{\circ} 30' S.$, and longitude $24^{\circ} E.$

"This letter, the only one which Dr. Livingston wrote from Naliek, was entrusted to the care of some native traders whom he met at that place, and by them delivered at Pongo Andongo, a Portuguese settlement in the interior of this province, whence it was immediately forwarded to me by the Portuguese authorities. It conveys the pleasing intelligence that, after having surmounted all the perils and hardships which presented themselves in his progress through the hostile tribes of the Chiboque and Balonda, and overcome the opposition of a native chief in crossing the river Casai, he was, to use his own words, 'at home, received with enthusiasm at all the different towns and villages through which he passed, and wanted for nothing the people had to give.'

"He had been detained ten days at Naliek, waiting the construction of canoes with which to descend the Zambesi, but was to start the day after the date of his letter to me; and, having the stream of the river in his favour, he expected to arrive at the Chobé in fifteen or twenty days.

“Notwithstanding all the sufferings which he had undergone in the earlier part of his journey, Dr. Livingston, I am rejoiced to say, informs me that, on the date of his letter, he was, through the merciful providence of God, in as good health as he ever enjoyed in his life, adding, ‘You will be pleased to learn that my men are all in high spirits, and quite prepared for another trip, although, as we have had to sell almost everything for food, they have but little to show after their long absence from home.’”

3. *Letter from Commodore TROTTER to the Secretary of the Admiralty, on the Result of Inquiries made at Quilimane respecting Dr. Livingston.*

Communicated by the ADMIRALTY.

“In reference to your letter of the 5th March last, No. 25, conveying to me their Lordships’ directions to order the commanding officers of any cruisers, in the Mozambique Channel, to make inquiries at Quilimane respecting the Rev. Dr. Livingston, who was expected at that place in November last from across the continent of Africa, I request you will inform their Lordships that H. M. S. ‘Frolic,’ during her late cruise in the Mozambique, called twice at Quilimane, in October and December, but that Commander Nolloth was not successful in obtaining intelligence of this enterprising traveller.

“H. M. Brigantine ‘Dart’ (tender to ‘Castor’), under the command of Mr. James P. McClune, second master, now on the eve of departure from this port for the Mozambique, is ordered to proceed to Quilimane, to afford the Rev. Dr. Livingston all the assistance he may require, should he have reached that place; but in the event of his not having arrived, the ‘Dart’ is to cruise for the suppression of the slave trade and the protection of commerce, the Commander leaving a letter for Dr. Livingston, stating when he will be back, and taking care not to be absent from Quilimane more than three weeks at any one time.

“Dr. Livingston is to be offered a passage to the Cape of Good Hope in the ‘Dart’ if he wishes it.

“Commander Nolloth, of H. M. S. ‘Frolic,’ reports that his Excellency the Governor of Quilimane has caused every arrangement to be made to ensure the comfort of Dr. Livingston and his safe arrival on the coast, whenever he may place his foot within the Portuguese territory.”

4. *Letter from Commander NOLLOTH to Commodore TROTTER, with Enclosures.*

Communicated by the ADMIRALTY.

“ The Governor assured me that he had given ample directions, providing for Dr. Livingston’s welfare, should he make his appearance at Teté; and that he had ordered his own dwellings at that place, and at Senna, to be placed at his disposal; and he was good enough to say that he would send still further directions.”

Commander Nolloth encloses a detailed statement of the time occupied in voyages and journeys between Quillimane and Teté at different times of the year. The most favourable voyage *down* river occupies three days, and the most unfavourable voyage *up* river forty days.

He also sends a translation of the Mozambique Government Gazette of March 17th, 1855, containing a few of the names of the places through which the Moors passed, who journeyed from Zanzibar to Benguela and back again to the East Coast by a different route. They left Benguela June 7th, 1853, and arrived at Mozambique November 12th, 1854.*

5. *On the Causes of Dryness in certain Arid Districts.* By
THOMAS HOPKINS, Esq., of Manchester.

MR. HOPKINS examines into the nature and causes of those winds which blow in regular directions. He argues against the principle of the Hadleian theory, and disputes many facts commonly advanced to sustain it. He denies any general and obvious movement of the atmosphere from the polar to the tropical regions, and asserts, on the other hand, that all regular winds blow to one or other of the following places—they being the great mountainous districts of the globe, which arrest vapour and produce heavy rains, and which he calls “areas of condensation:”—the Andes, the Himalaya, the lofty islands of the E. Archipelago, and the snow mountains of Tropical Africa. Other mountains produce similar effects, but of secondary importance.

Mr. Hopkins’ hypothesis is that mountains condense vapour from the air that surrounds them—that this process of condensation liberates heat which raises the temperature of the air—that a partial vacuum results from this condensation and heating, which is filled by indraughts of air from all sides. These create ascending vortices, and cause a boiling up and an overflowing of large masses of the atmosphere in the higher regions; here they diffuse themselves, and in time descend, perhaps in far distant places, or they may press upon and put in motion the air that lies beneath them. As the wind passes from colder latitudes

* For further particulars about their journey, See p. 75.—ED.

to any one of the above-mentioned "areas of condensation," which happen all to be in the tropics, it acquires, from that cause alone, a greater capacity for dissolving vapour, and becomes a drier wind. If it passes over the sea, it supplies itself with moisture in its passage; but if over a continent which yields little evaporation, the farther it travels the drier does it become.

The mountainous and rainy promontories of South America, South Africa, and Van Diemen's Land, have a special influence upon the dryness of the winds which blow over them to the northwards, for they abstract a large portion of the vapour which they would otherwise have carried along with them.

From this reasoning Mr. Hopkins would conclude that every country which lies between the above-mentioned "areas of condensation," and any great extent of continent stretching towards colder latitudes, is necessarily traversed by a dry wind, and thereby becomes arid and desert. It is thus that he accounts for the deserts in either hemisphere.

He concludes by hoping that future travellers will not omit to observe the force, direction, and moisture of the wind in the various countries they visit. Observations made at sunrise, and again at the hottest time of the day, say between one and two o'clock, would be of value.

Mr. Hopkins' paper is of considerable length, and enters minutely into details respecting the physical features that influence the aridity of each desert tract.

CAPTAIN FITZROY said that the subject of the paper was too difficult to be dealt with in a short space of time. He could wish that the paper had been divided into distinct heads, so that each might be more easily referred to. With the main argument of the paper he should take issue at the very outset. That argument was based on the assertion that "*condensation of vapour causes a vacuum.*" Now, some of the ablest men who had studied the effect of the presence of aqueous vapour upon the weight of the atmosphere, had come to entirely different conclusions respecting it. Whether therefore aqueous vapour adds to or diminishes the weight of the atmosphere, is a disputed point. Some *add* a correction to the weight of a column of air, on account of the vapour included within it; while others (and a very large number) contend that this very correction ought to be *subtracted* from the weight of the given column. That no vacuum is produced by the condensation of aqueous vapour in the atmosphere is shown by the barometer, which does *not sink* after a fall of rain, but, on the contrary, *rises*, showing that the atmosphere has become heavier. Where moving masses of air meet with high lands, there is no doubt that their moisture is condensed: therefore it is that the windward side of mountains is usually clothed with forest, and abounds with water, its fertility being consequent upon its rainy climate, while the opposite side is characterized by dryness and by a clear sky. Among many examples that might be given, he would instance the Galapagos Islands (a group in which the evidence of volcanic agency was very abundant); here the wind is perennial, from the eastward; consequently, the windward sides of the mountains on these islands are covered with forests to their summits, while, on the opposite sides, the lava is still as sharply edged as it ever was, cutting the shoes of those who walk over it. The whole subject of atmospheric

circulation is, as has been said, very difficult; it is yet "an overwhelming mass of detail, which we have not sufficient light to penetrate sufficiently."

MR. GALTON objected to certain data, regarding South Africa, upon which Mr. Hopkins had argued. He described that continent, up to the 6th degree of S. lat., as being low and arid, whereas the fact is the very reverse. The height of the table-land of South Africa was great: at Lake Ngami it was 3800 feet, and at the sources of the river that fed it from the north it was necessarily greater; in Damara-land it far exceeded 4000 feet. Again, the Karriharri desert and those portions which lie S. of a line joining Delagoa Bay and Great Fish Bay are undoubtedly arid, but, to the northward of that line, such enormous quantities of rain fall that the country is at times impassable. Lobale and the Borotsé Valley are deluged with water, and their villages are built upon mounds to preserve them from floods. The streams of different water-sheds are described as interlacing, and, even in Damara-land, the country suffers more from excessive alternations of seasons than from actual drought. Thus, during a rainy season, an hippopotamus has actually travelled overland from Omanbondé to the Swakop, across a tract which, in the dry time of the year, was utterly destitute of water except in a few wells and scanty springs. Farther to the N. we find the great lake Nyassi, to which so much attention has been recently drawn; and, he would add, in corroboration of its extent, and especially of the great bend from E. to W. which Mr. Erhardt believes to exist, and which appears upon his map, that in a route of Arab traders * across the continent, out of about 100 stages, whose name they record, 17 have the prefix of Niassa, by which we may roughly infer that that proportion of their entire route from E. to W. lay alongside this bend of the lake.

MR. HOPKINS explained that he had stated in his paper that South Africa was not so dry as Patagonia or Peru, and that in this respect its character was not so strongly marked as that of the other continents of the S. hemisphere. He thought that an elevation of 2000 feet, or even 4000 feet, for the table-land, would not be sufficient to arrest the vapour so as to produce a large amount of condensation; much of it, therefore, passed on to the mountains near the equator, which are, say, 15,000 feet high.

6. *Removal of Pitcairn Islanders.*

The PRESIDENT (Rear-Adm. BEECHEY) remarked upon the interest which the English have taken in these islanders, and upon their recent removal to Norfolk Island. He thought they would exercise a most beneficial influence upon the inhabitants of the neighbouring islands of the Pacific, who have but recently, if at all, emerged from a state of barbarism and even of cannibalism.†

The BISHOP of OXFORD, F.R.G.S., quite agreed with the President as to the great importance of this removal of these people to Norfolk Island, and trusted that it might be productive of all the good he anticipated. He called attention to the remarkable manner in which the work of self-purification had proceeded among them, although all external influences seemed adverse. Their chastity, and their strictness with regard to property, were points worthy of the deepest admiration, subjected as they had always been to the evil influences arising from ships' crews landing on their island. Seeing that they had gone on so favourably under such adverse circumstances, it could not but be hoped that they would exercise a very beneficial effect upon others around them, when they were countenanced and helped by the British Government. By

* See p. 75.

† See p. 77.

their removal, a new centre of religion and civilization would be placed in that quarter of the world; at the same time it was an experiment attended with no little risk. Their present virtues were connected with a certainly child-like cast of character, and in a fertile island, and under new circumstances, they would be exposed to a wholly new set of temptations.

SIR THOMAS FREMANTLE, F.R.G.S., stated that he had received some very interesting accounts of the Pitcairn Islanders from his brother Captain Fremantle, R.N., of H.M.S. 'Juno.' His brother, who was the chief officer on the Australian station, had been directed by the Admiralty to send a ship to Pitcairn's Island, to propose to the inhabitants, from the Government, that they should be removed to Norfolk Island. Having nothing to engage him particularly, he went himself in the 'Juno.' The account he gives of the people quite comes up to all that had previously been said of them. They were especially remarkable for their simplicity of manners and for moral and religious principles. On his arrival, Captain Fremantle assembled in their church the whole population of the island, amounting to about 180, in number, of both sexes, and read the proposal to them. They listened with respectful attention, and discussed the matter with great good sense among themselves. Being convinced that their own island was no longer large enough to support them, they determined to accept the offer, cordially thanking the Government. Some few, who hesitated at first, signed the paper next morning. There was one remarkable condition which they had asked, but which it would probably be extremely difficult to accede to: it was, that as they had always lived happily without the access of strangers, the British Government would grant them the privilege of keeping exclusively to themselves the possession of Norfolk Island. Sir T. Fremantle regretted that he was not prepared to afford more detailed information to the Meeting from the interesting letters of his brother, but some months had elapsed since he had read them, and he was not aware that the subject would be adverted to at the Meeting.

Ninth Meeting, April 28, 1856.

REAR-ADMIRAL F. W. BEECHEY, PRESIDENT, in the Chair.

Mr. Josiah Berry; Rev. A. Clive; Lieut. C. A. C. De Crespigny, R.N.; the Chevalier A. Duprat (of the Cape of Good Hope); Mr. William Ferguson; Mr. Alfred L. Halloran, R.N.; Mr. A. R. Johnston, F.R.S.; Mr. Charles Lee; Dr. Macpherson, M.D. (Inspector-General of Hospitals, Kertch); Mr. Frederick North, M.P.; and Mr. Joseph Hall Worthington, were elected Fellows.

The Papers read were—

1. *On the Current along the Coast of Greenland.* By Commodore C. IRMINGER, of the Royal Danish Navy.

HE argues that the current which leaves Spitzbergen and runs along the coast of East Greenland, does not travel thence, in a straight line, towards the banks of Newfoundland, but that it turns round Cape Farewell and runs north to the 64th, or even 67th, degree of lat.; then, passing, westward, to the opposite side of Davis Straits, it falls into

the current from Baffin Bay, that runs southwards along the coast of Labrador. Commodore Irminger bases his arguments upon quotations from the logs of twenty voyages; by which he determines the limits of the ice carried by the current. He also remarks that the existence of this ice is well known to the captains of Danish vessels, who habitually shape their course so as to avoid it.

MR. A. G. FINDLAY, F.R.G.S., said, that the only traveller who had given any information as to the currents on the S.E. coast of Greenland, from personal observation, was Captain Graah, of the Danish Navy, in 1829-30. He particularly mentions* that no current is observable on the shore, but that outside the vast accumulation of ice which is pressed on to it, there is a set to the S.W.: this, however, he states from other authority. That there is a set from the N.E. towards Cape Farewell can scarcely be doubted, from the facts of the drift of the wreck from the Dutch fleet in 1777† and other vessels in that direction; but this may be caused by a temporary and not a permanent current between Iceland and Greenland.

There are one or two circumstances which bear strongly on the subject, and corroborate the views of Commodore Irminger. A plank of mahogany was drifted to Disco many years ago, and was formed into a table for the Danish governor of Greenland at Holsteinborg.‡ Admiral Löwenörn also picked up a worm-eaten mahogany log off the S.E. coast of Greenland. The inference is that these came from the S.W., from the West Indies; and their course will confirm the facts quoted by the author. This current round Cape Farewell to the W. and N. has been described by Sir James Ross, § Dr. Kane, and other later voyagers, but the present paper threw great light on its character.

2. *Letter upon the Bonin Islands, from Captain QUIN, R.N., F.R.G.S., to the Admiral in command of the India Station.*

CAPTAIN QUIN visited these islands, in command of H.M.S. 'Raleigh,' in 1837. He found the inscription left in 1827 by the President (then Captain Beechey, in command of H.M.S. 'Blossom') on Peel Island, when he took formal possession of the group. Captain Quin's letter gives a succinct account of what had befallen the islands since that time. In 1830, they were first settled under the British flag; and, up to Captain Quin's visit, nine vessels (seven of which were English) had touched at them, and lost a few deserters out of their crews. In 1837, Captain Quin erected a substantial flag-staff on Peel Island. He found there much cultivation of all kinds of produce. There was an abundance of pigs, and some of these, as well as goats and poultry, had run wild and multiplied in the woods. The island was well timbered, and free from snakes and other noxious animals. Not the least vestige of previous occupation had been discovered by the settlers.

* Narrative, &c., pp. 113, 114.

† Capt. W. Scoresby, 'An Account,' &c., pp. 216, 217. [Commodore Irminger quotes the 'Accounts of the Whalers in 1777, by Larens Hansen, Director of the School of Vibé,'—a town in Denmark.—ED.]

‡ 'Quarterly Review,' No. 36.

§ Vide Captain Graah's Narrative, p. 24, &c.

The PRESIDENT said that this group of islands was interesting from the growing importance of steam navigation in the Pacific Ocean. The islands themselves are insignificant, but, from their situation, they may become very important as a coaling-station for vessels trading between America and China. Commodore Perry had pointed out their importance in this respect. The priority of discovery is, according to that gentleman, a matter of question between Great Britain and America. The Commodore had blamed him for not giving the credit of discovery to a (supposed) American captain, who is said to have seen the southern group of the Bonin Islands; but the islands, referred to in this statement, were situated to the S. of the Bonin Islands, and some of them, especially Sulphur Island, had been seen by Captain Cook, and others, before the Americans became an independent nation. When Admiral Beechey took possession of these islands in 1827, he had no knowledge that Captain Coffin had seen any of them.* At that time, he found only two seamen upon them; the population has since considerably increased.

3. *On the Connection between the Atlantic and Pacific Oceans, via the Atrato and Truando Rivers.* By Mr. F. M. KELLEY, of New York.

IN describing various routes for effecting the long-desired junction of the Atlantic and Pacific, through the great American isthmus, Baron Humboldt had, fifty years ago, pointed to the river Atrato, and to the depressions said to exist in the mountain range between that river and the Pacific. Captain FitzRoy and others had also contributed more recent information on the same subject in the Journal of the Society; but, up to the year 1852, no actual surveys had been attempted. In that year, Mr. Kelley of New York, and other gentlemen, despatched a surveying party, under Mr. Trautwine, C.E., to survey and level the Atrato to its sources, and to pursue the work across the dividing ridge, and along the most practicable waters, to the Pacific, with a view to the construction of a ship canal. Mr. Trautwine, with his party, surveyed the mouths and course of the Atrato, and extended his inquiries along its western branch, the Quito, and across the dividing ridge, along the Baudo and the San Juan, to the Pacific. The Raspadura Canal, which was said to connect the Atrato and the San Juan, was unknown, and, if it ever existed, could have been nothing more than a canoe-slide between two streams. During the journey "astronomical observations for latitude were made as often as the usually obscured state of the heavens would allow. Altitudes were taken by the spirit-level and barometer; the width of the river, by angles from a measured base; and distances along the streams, by repeated observations of the rate of the boats' passages." This survey was immediately followed by two others, despatched at Mr. Kelley's sole expense, under Mr. Porter and Mr. Lane, civil engineers, accompanied by assistants, and fully equipped.

* See R. G. Soc. Journal, vol. xxv. p. cxiv.

These expeditions confirmed the observations of Mr. Trautwine, and proved that no ship canal could be constructed from the head-waters of the Atrato to the Pacific; but the information acquired, induced Mr. Kelley to despatch Mr. Lane on a fourth expedition, to survey the Truando. Mr. Lane ascended that river and reported favourably, but sickness prevented him from crossing to the Pacific. Mr. Kelley, therefore, sent a fifth expedition, under Captain Kennish, an English engineer, accompanied by Mr. Rude and Dr. Jameson, with others, to proceed to the Pacific, and trace the coast from the Bay of Panama southward to 7° north latitude. If a harbour could be found, the interior was to be explored; and if the mountain range presented sufficient depression for a canal, the expedition was to carry its surveys through to the Atrato. Captain Kennish found a harbour in the bay, terminated on the south by Cape Marzo; and here, also, he observed the Cordillera to be diminished in height from thousands to, only, hundreds of feet. On crossing the water parting he struck the Nerqua, a tributary of the Truando, and from thence the party descended in boats to the Atrato. His survey and levellings have resulted in a plan for a ship canal, without a lock or any other impediment. After crossing the bar, which must be removed, the Atrato maintains a depth of 47 feet up to the Truando, and a width of 750 to 1000 feet. The Truando is navigable for thirty-eight miles from the confluence; and the remaining twenty-five miles to the Pacific will require cutting and a tunnel of three-and-a-quarter miles. Mr. Kelley regards the connection of the two oceans as a work of too great importance to be undertaken without full and authoritative investigation of an international character. Having carried the investigation thus far, he is now desirous that the question of uniting the two oceans, which has been discussed ever since the Spanish occupation of America, should be settled. The immense increase of commerce between the Atlantic and Pacific, following the discovery of gold, renders the subject now of pressing importance. The United States Government is willing alone to proceed with the survey; but European interests ought also to be represented. The English Government is not unwilling to co-operate; and all that is required, to insure the national survey of the practicable routes between the oceans, is the establishment of cordial relations between the Governments of the United States and Great Britain.

The PRESIDENT, in inviting discussion on this paper, observed that several plans had been proposed to establish lines of traffic between the two great oceans, but that all had as yet been found too difficult of execution, with the single exception of the Panama Railway. The route for a ship canal, which Mr. Kelley had proposed, appeared to possess so many advantages, that that gentleman had come over from America in order to make it known. There were three questions which the subject naturally suggested:—the *financial*; the *engineering*; and the *hydraulic*, as to whether a sufficient depth of water could be obtained for ships to pass from the Pacific, down the Atrato, into the Atlantic Ocean; and he would call especial attention to the last point.

CAPTAIN FITZROY, F.R.G.S., said that the subject of the connexion of the two oceans was one of the most important that could be brought before the Society, as it involved the interests not only of Europe and America, but of the whole world. To discover the means of effecting it, so as to afford a passage for the largest ships, was the most practically useful problem in geography in the present day. It had occupied attention from time to time during the last three hundred years, but especially during the last half-century; so that now it was easy to obtain a mass of details, respecting most portions of the isthmus of Central America, without leaving one's own country. In former discussions before the Society, two projects for canals had been mentioned. One of these was from the Gulf of San Miguel to Port Escoces; the other from the mouth of the Atrato to Cupica Bay. Humboldt had pointed out the advantages of Cupica Bay, and the comparatively easy line of communication between it and the Napipi River. Since then, Cupica Bay had been surveyed, and had been found to be one of the best harbours on that part of the coast. Commander Wood, F.R.G.S., who surveyed it, stated that he landed from his ship in Cupica Bay after breakfast, walked from the coast across the ridge, bathed in the Napipi, and returned before 12 o'clock. In his opinion, the dividing ridge was not more than 400 feet above the sea level. The communication, therefore, in this part would be comparatively easy; but whether this route or that between Humboldt Bay and the Truando, as pointed out by Mr. Kelley, be the more practicable, can only be determined by an accurate survey of each. The difficulty resulting from the climate, would apply equally to all the proposed plans. It is excessively wet nearly all the year round. Only two or three months are free from excessive rain; yet those who have been much exposed to it have suffered but little, as the experience of Mr. Kelley's exploring parties testifies. Those who have crossed the isthmus in various places also report favourably of the comparative healthiness of the climate. The two precautions necessary to be taken, are, to provide abundant shelter and wholesome food for those engaged in it. The settlers at Port Escoces failed, entirely on account of their neglect of these two simple precautions. Humboldt, who is the best authority on the whole of this region, and who collated all the trustworthy accounts of it which he could find, is of opinion that the route from Cupica Bay, along the Napipi, is the one offering the greatest facility for a ship-canal. The fact that three lines, each offering a probability of success, are now proposed to the world, furnishes a strong argument that an expedition should be undertaken to effect a more complete survey. The matter is one that affects, in a greater degree, the rising generation, as the work would take a great many years to carry out; but a beginning should be made by ourselves. Like the Panama railway, it would probably be found, eventually, a much more practicable undertaking than it is generally thought to be. That railway now pays well; ten years ago, the attempt to construct it was by many deemed chimerical. In conclusion, he considered it most desirable that an expedition should be sent out, to explore thoroughly the three lines that had been indicated, that their relative merits might be compared.

MR. JAMES WALKER, C.E., F.R.G.S., said that the height of the water level above the mean level of both oceans, was an important element of consideration, and until this was determined accurately, it would be impossible to enter into the hydrographical question. Again, the proposed diversion of part of the waters of the Atrato into the Truando, would tend to diminish the stream of the Atrato below its confluence with the Truando, its sectional area might be considerably decreased, and the river might be thus unfitted for the navigation of large vessels. A work of this description appeared to him to be impossible without the use of locks, and the construction of the required tunnel would be a very formidable work; but, as the object to be attained was a great and national one, the best thing that could be done would be to have a good

survey made. The vast quantity of water in the rainy season had been complained of. A large quantity of rain, he thought, would most of all favour Mr. Kelley's project, as it would serve to maintain the streams of the rivers. Mr. Walker referred to the Caledonian Canal, of which the great repairs and improvements made after its original formation were done under his direction, as in some degree a parallel case to that of the Atrato and Truando, and also to the proposed junction of the Pacific and Atlantic through the Lake of Nicaragua, on which he had, with Colonel Aldrich, R.E., reported to the British Government.

MR. KELLEY, in answer to some questions proposed by Mr. Walker, remarked that an excavation of only 120 feet in height, or 90 feet above high water, would be required for the tunnel, as vessels would strike their topmasts; also, that the mean inclination of the Truando was 3 inches per mile, and not a foot, as had been stated. The sectional area of the Atrato, at the junction of the Truando, was 350 yards broad and 58 feet deep. He proposed to deepen the bed of the Truando 15 feet, and to convert it into a canal to run into the Pacific. In his plans he had calculated that all the water for the canal might be derived from the Atrato, although the valley of the Truando abounds in lagoons and swamps from which much water might be obtained.

MR. PEACOCK, F.R.G.S., had met at Buenaventura, Admiral Illingworth, of the Bolivian Navy, who had travelled on the San Juan. He had ascertained that the "Arrastadera" (Raspadura) Canal, said to have been formed by a curate at the end of the last century (who died in the "Inquisition" at Carthagená), really did exist, and that goods had been sent by it from one ocean to the other. This gentleman had also stated that the Napipi could be reached from the Pacific after crossing a small elevation, probably not more than 100 feet, by following the windings of the valleys between the mountains; and that, in the Atrato, there was plenty of water for the largest ships. The bar, at the mouth of the river, might be easily removed, or, what would be still better, a canal might be cut from deep water to deep water, as, if the bar were removed, the mouth would probably soon silt up again. He thought that the importance of the work could not be over-estimated. In his opinion, the climate was the only great obstacle to success: the valley of the Atrato had been called the Valley of Death, so far as Europeans were concerned. Panama is comparatively healthy, yet very many had lost their lives in the construction of the railroad.

MR. WEBSTER, F.R.S., thought that there had been some misunderstanding with regard to the levelling. The level from Humboldt Bay to the Truando had been ascertained by means of a spirit-level. In answer to Mr. Walker, as to whether this route were intended to exclude the Nicaragua scheme, he would say, No; Mr. Kelley had not brought it into contrast with other routes such as those of Panama and Nicaragua. The route Mr. Kelley had proposed was essentially a canal route, and the important question is whether any better route can be devised. The mouth of the Napipi appears to be about 70 miles farther up the Atrato than the mouth of the Truando. Now, it would plainly be desirable, in order to secure the greatest depth of water, not to ascend the river too far. Therefore, at first sight, the proposed route is the most practicable. The tunnel required had been objected to; yet, what was a tunnel of 3 miles, compared with the tunnels on some of our railroads? It is not quite fair to contrast this scheme with railway schemes; but the comparison of work to be done was favourable to Mr. Kelley's route, as that would involve a removal of only 147,000,000 cubic feet of earth, whereas the Panama railroad required the removal of 226,000,000 cubic feet. The Nicaragua route, again, required several locks, and the works on that would be truly gigantic when compared with the route he proposed. He thought that the alarm at the drying up of the Atrato might serve for an objection by the engineer of a rival railway; but when it is known what such

engineers as Walker, Telford, and others have done in the fen districts with such simple means, he saw no reason why something equally effective might not be done here.

DR. BLACK said, that though no engineer, he saw plenty of difficulties to be overcome ; but the question now was not as to difficulties—it was as to the discovery of a practicable route for a ship-way between the two oceans. He thought that the repeated examinations made under Mr. Kelley's direction, and at his sole expense, reflected the greatest credit upon him. The route thus indicated looked as though it might be carried out. He concurred with the opinion so ably expressed by Captain FitzRoy, as to the world-wide importance of this subject, which no difficulties should prevent us from pursuing. The whole of that part of the barrier between the two oceans, which is now unknown, should be thoroughly investigated by the great maritime nations, that the world might know what were the obstacles to be overcome, and what would be the cost of overcoming them. The question would then be—has the commerce of the world arrived at a point which would justify the necessary outlay of capital to execute the work ? The time, if not arrived, is rapidly approaching when this great work must be done in spite of all obstacles and any cost. He fully believed that the benefits to be derived would quite repay any amount of capital that it would be necessary to lay out. If commerce goes on increasing at the rate it has done for the last twenty years, it would be hard to say how much capital might not be laid out so as to yield a prospect of a fair return. Allusion had been made to the unhealthiness of the district : no doubt this was a difficulty ; but from strict investigations which had been made, it had been ascertained that the chief mortality in the construction of the Panama railroad was not owing to the climate. The men were of a very mixed class ; no care was taken to house or feed them ; good water was not provided for them, and they were allowed to buy spirits as they pleased. Like navvies, they were allowed to do what they wished, and when they died, others were put into their places. If the men who may be employed on the isthmus, hereafter, are attended to and protected as they should be, the mortality will doubtless be much less among them. Allusion had also been made to railways on the isthmus. He was sure that Mr. Kelley had no jealousy against railways, but would be the more delighted the more there were that crossed the isthmus, as the increase of commerce thus indicated would require a corresponding increase of ships. Commerce arises from two causes :—first, from the variety of natural or artificial products in different parts of the world ; and secondly, from an instinctive love of gain and the desire to supply new wants. When different countries became acquainted with the difference of their products, they were sure to trade with each other, whether separated by mountains, deserts, or oceans. He thought that we were much indebted to Mr. Kelley for his liberality and his boldness in bringing forward his proposal ; and he hoped that the commercial nations of the world, the United States, France, and Great Britain, and even Russia, would combine in causing the barrier between the two oceans to be no longer unknown to us.

M. DE LESSEPS : M. le Capitaine FitzRoy, parlant d'un projet de canalisation de l'Isthme de Darien, vous a dit tout à l'heure, dans un langage éloquent, que beaucoup de grandes entreprises, paraissant d'abord chimériques avant d'avoir été étudiées, deviennent réalisables aux yeux de tout le monde, lorsqu'elles ont été sérieusement examinées sur les lieux ; j'espère qu'il en sera ainsi pour le Canal Interocéanique dont il vient d'être question, et je fais des vœux pour sa réalisation. Quant au percement de l'Isthme de Suez, sur lequel M. le Président a bien voulu m'inviter à dire quelques mots, je puis vous assurer que l'entreprise est tout à fait praticable. J'ai réuni, il y a peu de mois, une commission composée des plus célèbres ingénieurs de l'Europe dans les travaux des ports ou de canalisation, et dont font partie MM. Rendel et

M. Lean, bien connus de vous tous ; M. de Negrelli, inspecteur général des travaux publics de l'Autriche ; M. Paleocapa, ministre des travaux publics de Sardaigne ; M. Conrad, ingénieur en chef des Pays Bas ; M. Lentze, directeur des travaux hydrauliques de la Prusse ; M. Renaud, inspecteur général des ponts et chaussées de France ; M. Lieussou, ingénieur hydrographe de la marine Française ; et M. Montesinos, directeur général des travaux publics de l'Espagne. La majorité de cette commission s'est rendue en Egypte ; elle a déclaré à l'unanimité que la canalisation de l'Isthme de Suez et l'établissement de deux ports sur la Mer Rouge et sur la Méditerranée étaient des œuvres faciles et d'un succès assuré, dont la dépense totale n'excédera pas deux cents millions de francs.

La rade de Suez est vaste et sûre. Cinq cents bâtiments et plus pourraient y trouver place. Les profondeurs sont de 5 à 13 mètres sur un fonds de vase d'une excellente tenue. La corvette Anglaise *Zenobia* y sert depuis trois ans de magasin de charbon pour le service des paquebots des Indes. Elle est dans la région la plus exposée aux vents, et dans le cours de ces trois années ses ancres n'ont pas varié, ses cables n'ont pas éprouvé la moindre avarie, ses communications avec la terre n'ont pas été un seul jour interrompues, ce qui n'arrive pas constamment dans des ports qui passent pour excellents. Deux passes profondes et saines, assez larges pour qu'on puisse y louvoyer en tout temps à l'entrée et à la sortie, et s'ouvrant par des profondeurs de 16 à 20 mètres, donnent accès au mouillage.

La commission a pu conclure de ces données, que la rade de Suez avait toutes les qualités désirables pour former la tête du canal des deux mers, dont les jetées ne devront pas avoir plus de 1600 mètres pour atteindre les profondeurs de 8 à 9 mètres suffisantes pour les plus gros navires.

Sur tout le parcours de l'Isthme, dont la largeur est de 30 lieues de Suez à Peluse, la commission internationale n'a rencontré aucune difficulté pour le creusement du canal, ni pour sa conservation dans un sol uni, et dont la composition géologique est très favorable. Les sondages vérifiés par elle établissent que le sol de l'Isthme est, en général, formé d'une première couche de sable agglutiné, d'une seconde couche de terre argileuse, d'une troisième couche de marne calcaire jusqu'à ce que l'on arrive à l'argile plastique, vers 11 ou 12 mètres au dessous du niveau des mers.

Pendant notre excursion dans l'Isthme, le Vice-Roi avait envoyé la frégate à vapeur, le *Niz* dans le golfe de Peluse, où M. Larousse, ingénieur hydrographe, muni des instructions de la commission, avait pu exécuter de nombreux sondages dans des conditions très favorables, et lever le plan hydrographique de la baie. Il fut constaté, qu'en avant du cordon littoral, s'étendait une zone de sable fin pareil à celui de la plage, qui finit aux profondeurs de 10 mètres, à partir desquelles commence une zone de vase d'une bonne tenue pour l'ancre des bâtiments, et se prolongeant jusqu'aux grands fonds de la Méditerranée. La partie de la baie où les grandes profondeurs se rapprochent de la côte est à la hauteur de 6 aunes. L'on y trouve 8 mètres d'eau à 2300 mètres de la plage sur une étendue de cinq lieues entre les bouches d'Oum Farez et celle de Gamileh. C'est là que la commission a fixé l'entrée du canal par la Méditerranée. Des jetées de 2300 mètres n'ont rien d'extraordinaire ; et dans l'endroit où elles seront placées, l'abordage et l'appareillage présenteront toute facilité à la navigation.

Je m'occupe dans ce moment de la publication d'une brochure qui contiendra les procès verbaux des études de la commission internationale pendant son exploration de l'Isthme de Suez, ainsi qu'une réponse à la Revue d'Edimbourg, qui a propagé des idées erronées sur la praticabilité de l'entreprise. Les erreurs dans lesquelles est tombée la Revue sont excusables, parce qu'à l'époque où elle a traité la question, elle ne pouvait pas encore connaître les travaux de la Commission des Ingénieurs.

J'aurai l'honneur de faire hommage à la Société de Géographie de ma publication : elle fera suite à celle qui a paru à Londres l'année dernière, et que la Société a bien voulu accueillir favorablement.

The Meeting adjourned to the 12th of May.

Tenth Meeting, May 12, 1856.

REAR-ADMIRAL F. W. BEECHEY, PRESIDENT, in the Chair.

Lieut. M. F. Maury, of the United States' Navy, and Commodore C. Irminger, of the Royal Danish Navy, were elected Corresponding Members; and Charles Churchill, Esq.; Robert Ferguson, Esq., M.D.; James Hewitt, Esq.; and Rear-Admiral G. F. Rich, were elected Fellows.

The discussion on Mr. Kelley's paper on the Atrato Inter-Oceanic Canal, which had been adjourned at the preceding Meeting, was reopened by the reading of the following letter by the Secretary:—

Letter of BARON VON HUMBOLDT to MR. FREDERICK M. KELLEY.

(Translation.)

Berlin, 27th January, 1856.

It is with the most lively satisfaction that I have taken notice, during your too short visit to Berlin, of the great and solid operations which you have caused to be executed since the beginning of January, 1855, by Mr. William Kennish, a skilful engineer, in surveying and levelling the course of the great river Atrato and its affluents from the W. My learned friend Mr. Alexander Bache, superintendent of the coast survey of the United States, had already drawn my attention to the previous investigations which you had caused to be made; and these researches are the more deserving of regard in consequence of your proposal to extend the investigation, with equal precision, to the passage between Port Cupica and the river Napipi, as well as to other points situated above the confluence of the Truando—positions of great importance in the solution of the vast problem of an oceanic canal.

The great number of maps and sections on large scales, which you possess, furnish all the necessary elements for judging of the possibility of communication through the mouths of the Atrato, the Truando, and a canal leading from the latter to the South Sea. It is owing to such a complete examination not having been effected of the mountainous country between the Gulf of San Miguel and Caledonia Bay, that Mr. Lionel Gisborne's project in 1852 has not been executed. Igno-

rance of the locality, with the want of hypsometrical measurements, led to the sad results of Lieut. Strain's courageous expedition.

The great object to be accomplished is, in my opinion, a canal uniting the two oceans *without locks or tunnels*. When the plans and sections can be submitted to the public, a free and open discussion will elicit the advantages and disadvantages of each locality; and the execution of this important work, which interests the civilised nations of the two continents, should be entrusted to engineers who have successfully constructed similar works. The Junction Company will find supporters among those governments and citizens, who, yielding to noble feelings, will take pride in the idea of having contributed to a work worthy of the progress of intellect in the 19th century. This opinion I have expressed with warmth for more than fifty years. I have laboured, without ceasing, to disseminate the geographical views which tend to prove the possibility of commercial communications, whether by canals, with or without locks, either simple or coupled with inclines; or by means of railroads, uniting coasts or rivers having an opposite course.

Through General Bolivar, I obtained the exact geodetic levelling of the Isthmus of Panama. I was the first to make known, in my Mexican Atlas, the course of the two rivers Huasacoalco and Chimalapa, according to documents found in the archives of the viceroyalty of Mexico. I indicated the proximity of the almost unknown port of Cupica to the sources of the Napipi and the waters of the Atrato, as well as the existence, ignored in Europe, of a canal of very small dimensions, constructed in 1788, under the directions of a monk, curate of Novita, by the Indians of his parish, for connecting the waters of the Raspadura, an affluent of the Quito, with the waters of the San Juan de Chirambira. I think there is nothing more likely to obstruct the extension of commerce and the freedom of international relations, than to create a distaste for any further investigation, by declaring, in an absolute and imperative manner, that all hope of an oceanic canal ought now to be abandoned.

I have described already in my 'Essai Politique de la Nouvelle Espagne'* the immense operation of cutting through mountains the open canal, called the Desague of Huehuetoca, which was executed by the Spanish government at the commencement of the 17th century; and I have now too much faith in the power of the resources offered by modern civilisation, to be discouraged.

I am indebted to Colonel Codazzi, and to the affectionate kindness of the Minister of the Interior at Bogota, M. Pastor Ospina, for important communications which remind me that the route from Cupica

* See the last edition, vol. i., pages 202-248, and vol. ii., pages 95-145.

to the river Napipi presents successive elevations; and it would be an additional service to geography, if you would cause this route to be levelled.

The PRESIDENT then rose and observed that, as a previous evening had been given to the general question, and the strictly engineering question as to cuttings had been discussed already, and as there seemed to be no engineering difficulties that could not be overcome, he proposed to confine the discussion of this evening to the remaining portion of the subject, that of the water-level, or what might be properly called the *hydraulic* part of the inquiry; for if this should be found to be impracticable, the engineering portion would necessarily fail also; and as there might be some gentlemen present who had not heard the reading of the paper, he would mention a few of the leading points as they had been stated for their guidance. The proposition before the Society was to unite the Atlantic with the Pacific Ocean by means of a channel without any lock, by which ships of great burthen could freely pass from one ocean to the other; and it was proposed to effect this by means of the Atrato, using the lower part of that river as far as the junction of the Truando, a tributary river, and thence either to make use of the bed of the Truando as far as possible, or turn its stream into the Pacific by means of a canal. It had been ascertained that the mean water-level of the two oceans was the same, and it was assumed from the observations which had been made, that the point of the junction of the Atrato with the Truando was 15 feet above that level, and that the distance of this point on the one side was about $61\frac{1}{2}$ miles, and on the other about 63 miles. With these facts the question of interest was, whether under the proposed circumstances the water could be maintained in these two arms at such a level, considering the supply and the drainage, as would render the communication available at all times; and what would be the effect of the tide of the Pacific in passing up such a channel, whether it would facilitate or render more difficult the object in view? These were questions of the highest moment and of greatest interest; and seeing that the Meeting was favoured with the presence of several of the most eminent engineers of this country, he would leave the question in their hands, and ask Mr. Robert Stephenson to favour the Meeting with his opinions first: the point being not so much to consider the details of the question, as to determine whether the facts were sufficiently promising for the recommendation of a more accurate survey being undertaken.

MR. ROBERT STEPHENSON, F.R.G.S., said that the President seemed to fear a difficulty in reference to the tidal action at the junction of the Truando and Atrato. Considering the oscillation of the Pacific to equal that in the Severn, still it would present no difficulty to him. The distance is about 130 miles from sea to sea: no river in England was exposed for nearly so great a distance to tidal action; even the case of the Severn was exceptional. The engineering difficulties did not seem to him to be serious; but, as he was excluded from that side of the question by the decision of the President, he would simply add, that the great difficulty appeared to him to be in making a good entrance into the Atrato. At the entrance of that river vast quantities of mud had been deposited, and a delta of great extent formed, enclosing a series of lagoons, through which no permanent channel is maintained; and this is the case of all rivers that fall into a tideless sea. The success of the scheme would therefore depend on forming a good entrance to the river; for this, artificial communication would be necessary. He had no means of judging its feasibility, but would assume that it was feasible on Mr. Lane's statement. He concluded by expressing his high sense of the enterprise and liberality of Mr. Kelley.

In answer to a question from the PRESIDENT, MR. STEPHENSON explained

that a fall of 3 inches in a mile, which was that estimated in the present case, was not unusual in artificial canals; and that the supply of water would be amply sufficient to maintain the canal at a proper elevation.

SIR RODERICK MURCHISON, F.R.G.S., begged to observe that the discussion of this question had naturally assumed very much of an engineering character, and acknowledged that the Society was much indebted to the eminent engineers who had already spoken this evening and on a former occasion. He suggested, however, that no true inductions could be arrived at, nor any sound attempt made to realize the grand idea of Humboldt, until a *general and accurate geodesical survey of the whole region* alluded to had been completed. In this praiseworthy cause Mr. Kelley had done more than any other person, and he now asks this Society to exercise its influence with the British Government to assist, with other powers, in carrying out this great and essential preliminary survey, in the absence of which he did not pretend to say that the line he had suggested was the best which could be chosen.

MR. G. RENNIE, F.R.G.S., said that this was (to use the words of the President) emphatically a water question; for in the valley through which a canal would have to pass, rain fell almost incessantly for nine months in the year, and such rain was rarely seen in any other part of the world. It was therefore one of the most important elements, or rather aliments, of the question. With regard to the effect of admitting water into the canal either from the Pacific Ocean or from the Atrato, he had no apprehensions; for the length of the canal between its junction with the Pacific at Paracuchici and with the Atrato was so great, and the oscillation of the tide at either end so small (notwithstanding they were high and low at different periods), that before the water of a spring tide in the Pacific could have any effect on the water in the canal, the velocity of the water would be so retarded by the friction and resistance of the sides and bottom of the canal, as to reduce the inclination of the surface of the water (in the canal) to *three inches* per mile over the whole distance of the Truando part; but before the water of the Pacific reached the farther extremity, the tide would have fallen, and thus the two opposing forces of the pressure of the water without, and the canal within, would be reduced to an equilibrium. At 3 inches per mile, the motion of the water is scarcely perceptible. As regards the effect of the passage of the water-flow of the Atrato, no fear need be entertained; the area of the section of the Atrato at the junction, being from nine to ten times greater than that of the canal of the Truando, will afford an abundant supply of water to the canal. The Atrato is as wide as the river Thames at Waterloo Bridge, and 47 feet deep, so that there is ample width and depth for the largest merchant vessels, and even vessels of war. The objections to navigating it were considerable, as its channel was difficult to define, when passing through the many lagoons or lakes which overflowed its banks in many places, particularly at its junction with the Truando, which is described by Mr. Kelley to be usually covered by a vast lagoon or lake at the entrance, and thus very difficult to find; so that the course of the river or canal will have to be buoyed and staked, and pilots would be necessary. With regard to the other parts of the canal there were difficulties of no ordinary kind. The Truando was one of them. The entrance into the Gulf of Darien was exposed to the N. and N.E. winds, but their effect did not seem to influence the mouths of the Delta, behind which there was shelter. It had been proposed to convert the Coquito branch into the main entrance into the Atrato, by blocking up the branches and turning all their channels into the Coquito. There were other difficulties at the entrance into the canal from the Pacific, as at Paracuchici, where the surf beat strongly on the shore, although the water was calm inside. It would be a question between an entrance with an open mouth on that part of the shore, or into Humboldt Bay. It would also be reasonable to put down half a million as the cost of each harbour, in addition to the cost of the canal, estimated at thirty millions, say

thirty-one millions. The sum was great, but the object was still greater; and considering that the distance round the vast peninsula of South America was estimated at *nineteen thousand miles* from New York to San Francisco, and that by the canal it would be reduced to 5700 miles—considering also that the passage round Cape Horn was seldom less than *one hundred and fifty days*, and often above two hundred and fifty days; that the passage by the canal would be made in one hundred and five days; that the cost of maintaining the ship and crew of a fast vessel, including insurance and all charges, would be 10,475 dollars, not including the extreme contingencies of shipwrecks and loss of human life, Mr. Rennie was of opinion that the vast advantages which would accrue to the world at large were well worth the sacrifice.

MR. BEARDMORE, F.R.G.S., remarked that there were one or two facts and first principles of science which might be laid down as axioms.

The first was the relative level of the two oceans: he believed it to be a consequence of the law of gravitation that the mean level of the ocean was substantially the same at all parts of the globe, and would be so as long as a pound of sea water everywhere occupied the same space, and was composed of the same constituents. He had investigated every kind of available observation on the level of the ocean, including the Ordnance Survey of Great Britain, and the testing levels taken at the instance of the British Association between the English and Bristol Channels, and connected with the admirable surveys of the President (Admiral Beechey), and had in his own professional experience made numerous minute surveys, all of which confirmed this view. Where surveys showed different results, it was because the mean tide level had not been ascertained with sufficient accuracy.

He had also investigated the facts presented by Mr. Kelley, which appeared to him to prove incontestably that the junction of the Atrato and Truando could not vary materially from the stated height of fifteen feet above the mean sea level. With these facts, combined with the rise of twelve feet tide in the Pacific, the questions before the Meeting were—

Firstly. Whether a free communication between the waters of the Pacific and the Atrato, at the point in question, would be practicable for navigation?

Secondly. Whether such a communication would be likely to reduce the level of the Atrato to a serious or injurious extent? and

Thirdly. Would it cause any tidal action of a prejudicial nature on that river?

1. The first question might be answered in the affirmative without any hesitation; for the extreme fall could not possibly create a current greater than from two to three miles per hour, where beyond the tidal action; within it there would be the usual flow and ebb, to be found in a somewhat sluggish tidal river which has no great interior basin to fill or empty.

2. The second question might be dealt with in a familiar way, by assuming, for instance, that the Atrato had at present as much as four inches fall in any or every mile of its course. Now the river was evidently one of very large volume, and liable, from the character of the mountains draining into it, and from the excessive rainfall of the climate, to heavy floods; its width was therefore great, and its depth varied from 45 to 85 feet. Assuming, then, that it were possible to abstract sufficient water to reduce the surface fall to a minimum of one inch per mile (a flatness rarely to be found), the depth at the junction would only be reduced about *ten* feet, and the power of discharging its waters would be reduced 50 per cent.; or, in other words, one-half of its entire volume would be available to fall through the new cut towards the Pacific. But it must be remembered that, as the height of the Atrato at the point of junction was reduced, so would the velocity down the new cut be decreased, and therefore it would not in reality carry off any such proportion of the volume. These statements are matters of well-known fact in the science

of hydraulics, being consequences of the law that, *cæteris paribus*, the velocity and the discharge of any river vary as the square root of the rate of fall.

3. The third question admitted of a favourable answer. There were many familiar instances in this country where the tide had been admitted by new works into large areas, with great advantages to navigation, and without injury to other interests. No better example existed than that of Peterborough and Wisbech, at which latter place the tidal flow had been increased from 8 to 18 feet by the works of the Messrs. Rennie, and without affecting the flow at Peterborough, some 18 miles higher up the same river; and works were now being carried out there, which might probably increase the flow at Peterborough (now about 6 inches at spring tides) to 3 feet, with every advantage to navigation.

A familiar and grand example of Mr. Kelley's scheme occurs in the Hooghly or Calcutta river, which branches from the main body of the Ganges at about 170 miles above that city, and carries down large floods with a slope somewhat analogous to that proposed by Mr. Kelley, while the tide is felt for about half of its entire length from the Bay of Bengal, under circumstances well known to be highly favourable to the development of the tidal wave, and somewhat similar to the case of the Severn.

There were, however, most important engineering questions touching the especial manner of leading away the new line of navigation from the natural river, which could only be decided by the most careful surveys, and would depend on the amount and rise of flood waters; and the nature of the soil and valley at the position considered as being best adapted to meet the various contingencies of so important an engineering and geographical problem as the formation of an interoceanic ship canal.

It was a subject of infinite interest and value, and the very want of data, on which to speak more precisely, was the strongest argument for its claiming the attention of the Governments to its investigation by thoroughly experienced engineers and surveyors.

He thought it highly probable that at the junction of the Truando corrective engineering works would be necessary to control the flow from the Atrato, and to prevent the new cut being made a channel for flood waters; and how to do this effectually and economically was the great problem; all others were mere questions of money, and prudent adaptation of the works to the nature of the difficulties to be surmounted.

SIR RODERICK MURCHISON repeated, that Mr. Kelley's object in coming before geographers was to obtain their aid in bringing about a grand survey of the physical features and altitudes of the whole region in question, through the co-operation of the Governments of England, France, and the United States, an object which he thought must meet with the support of every geographer.

The Secretary then read a paper by Captain Lort Stokes, R.N., F.R.G.S., on Steam-Packet Routes between England, Australia, and the Cape of Good Hope. An animated discussion followed the reading of this paper, which was adjourned to the next Meeting. An account of the paper and of the discussion upon it will appear in the ensuing number of the Proceedings.

ADDITIONAL NOTICES.

1. *Journey from Benguela to Mozambique.* Translated from the Portuguese '*Boletim e Annaes do Conselho Ultramarino.*'

ON the 12th of November, 1854, some Moorish traders arrived at the capital of the Portuguese province of Mozambique, on the S.E. coast of Africa, bearing a despatch from the Governor of Angola, on the West Coast. They left Benguela on the 9th of June, 1853, and were accompanied by Antonio Francisco da Silva Porta as far as Cutonge, where they arrived in 107 days. It is to be lamented that no instructed person had joined the party, for very little information could be obtained from them. They found large towns and dwellings in every part; they had to pass four large rivers on rafts; they came to inhabited places where ivory was of very little value, and this was more or less the case throughout the journey, principally at Chamopa, on the right bank of the Chamoriro, a great river without fords. Provisions abounded everywhere, and the inhabitants were docile, and rich in good cattle. The following itinerary gives all the information which could be obtained from the travellers.

On the 9th of June, 1853, they left Benguela, and proceeding in a southerly direction, arrived at Cutonge, which they left on September 22, 1853. They passed the river Nambuate, travelling along the side of a thick forest on its left bank, through a fertile country. At Evianda they spent three days, and passing through the small town of Namelió, they reached the deep river Namecaque, 100 fathoms (braças) wide, running from north to south through cultivated plains. The following small places, with few inhabitants, were reached in succession, viz., Inane, Metondo, Chontongo, Molonde, Nuhete-Cassilura, and Luana; and then the fordable river Tuanhete, and the small places called Poinge, Mussangue, Cambira, Hate, and Macomba, the last having only a few people. The Moors then penetrated through a forest called Mulugane, where they suffered from a scarcity of water; and at Ohcoingo they found the great river Chamoriro, running southward, with the large town of Chamopa on its right bank, abounding with provisions, the country being cultivated. The track proceeds to the town of Haycolom, and across the small rivers Pacapiço and Mecomalache to the small towns of Tagumbe and Pasmube, and the forest of Xambia. Several towns were now passed in the following order:—Cartacorbo, Ococalhe, Hohambe, Coguem, Pohnina, Laquié, Muiasse, Viciú, Pacacello, Capane, Rumbue, Guiner, the large town of Coimba, with cultivated lands and no lack of food, Cocussilmba, Oramba, Rupachasse, and Pansuanrba, the last-named town having sufficient cultivated land, but its inhabitants are great thieves. After crossing the fordable river Corimba and Sund, they came to a town of the Muizas, called Paringa, where they could find nothing to eat; but several places were afterwards passed, all of which were inhabited and cultivated by the Muizas, and contained many people, who were generally hospitable and good. The names of these places are Semdá, Pacalem, Chuma, Musambe, Quelebia, Rusanga, Mataracuens, Musana, Timbore, and Pararo. The great river Ruanga appears to be the boundary of the Muizas territory. The next towns, Runga and Cambille, were followed by the forest of Muito, the town of Quicusse, with many people, and the forest of Tumbuca. Three towns were now successively reached, named Utura, Patuama, and Tagume, having many people and much cattle; then the small town of Uamache, and other small towns with few inhabitants, named Tabiá, Tambuca, Muache, Cocassura, Moache, and

Caioara. Utumbuca Pambraculima has a commodious town, and provisions in abundance. Utumbuca Modonê has no town, but there is a river, and the party were detained here a day. They now reached the Nhaça (Niassa) country, and passed the following towns with few people and much provisions, named Nhaça Buha, N. Pamucamba, N. Paherere, N. Pamira, N. Pachicoca, N. Pacamonga, N. Paquasi, N. Pachamonga, N. Pomoro, N. Mamutamlarasa, N. Pamunabombi, N. Papache, N. Pamacquba, N. Pacafurmira, N. Passifuri, and N. Chamuconde. The town of N. Paquasi, before mentioned, is large, with many people and much provisions. The Moors were attacked here for nine days; they killed sixty-five persons and wounded eight, and three of their own party were killed. On leaving the Nhaça, the Jana country was entered, and the following towns were passed, containing many people, viz., Jana Pacamussicusa, J. Passimoro, J. Pamudicula, J. Pajimucudo, J. Paruere, J. Pamuganbo. These were succeeded by the populous town of Uvuma; the town of Maconde, with much forest; Miquindane, a Moorish town containing a large mosque, and the towns of Mucimbua and Ibo, with many inhabitants of good character. The last-named town, Ibo or Wuibu, is on the Mozambique coast, and terminates the itinerary. Neither bearings nor distances are mentioned, and the time occupied is only spoken of once, during the whole journey, namely, on reaching Cutonge. Among the names that can be identified are those near the Mozambique coast, also the Jana, the Nhaça, the Tumbuca, the Muizas, and the river Ruanga; the rest are almost entirely unknown.

2. *Table of Pluviometer, kept at George Town, British Guiana.*

MONTHS.	1829.	1830.	1831.	1832.	1833.
	Inches, 100ths.	Inches, 100ths.	Inches, 100ths.	Inches, 100ths.	Inches, 100ths.
January .. ..	..	9·27	13·84	17·96	3·41
February .. ..	..	6·08	10·12	3·64	2·74
March .. ..	..	10·10	15·82	11·49	3·69
April	4·90	10·78	19·48	4·76	7·67
May	13·71	11·02	12·09	8·57	4·49
June	10·48	10·65	13·42	9·98	7·87
July	16·22	7·27	16·48	3·32	8·33
August	1·88	7·43	18·56	2·78	4·47
September ..	5·49	1·15	2·16	0·91	0·41
October	0·74	1·00	1·16	0·15	..
November ..	1·85	1·91	7·17	2·44	..
December ..	12·05	12·98	6·39	8·60	..
	68·21	89·74	136·60	74·60	

(Signed)

R. OWEN.

3. *Analysis of List of Pitcairn Islanders landed in Tahiti 23rd March, 1831.*

(From a Letter of Capt. SANDILANDS.)*

Males, 46 ; females, 39 :—Total, 85.

The eldest man was Thursday October Christian, aged 44.

The eldest woman, Mary Christian, aged 37.

The average age of males was 13½

Ditto females 10½

The number of males under 12 was 26

Ditto females do. 20

Number of males over 20 11

Ditto females do. 10

Of one woman, Susannah Christian, a native of the Sandwich Islands, the age was not known ; and one child, Lucy Ann Quintall, was born at sea, on the passage from Pitcairn Island to Tahiti.

The names and number of persons in the families removed were—

Name.	Male.	Female.	Total.
Christian	10	11	21
Adams	3	..	3
M'Coy	7	3	10
Quintall	10	8	18
Young	7	6	13
Buffett	4	..	4
Nobbs	2	..	2
Evans	3	..	3
Uncertain .. ..	..	11	11
	46	39	85

The large proportion of children, and the immature age of the majority both of males and females, as indicated by the above analysis, sufficiently accounts for the mortality from which they suffered during their residence at Tahiti.

An interesting fact relative to the return of these people to their original habitation is mentioned by Captain Fremantle, in the enclosure of Captain Sandilands' communication, viz., that the cost was defrayed by the sale of the copper bolts of 'The Bounty.'

* See also vol. iii. of the Journal R. G. S.—Ed.

4. *Extracts from a paper on the Isthmus of Darien.*

By Dr. CULLEN.

NEAR Cana, on the river of the same name, which is an affluent of the Tayra, or Santa Maria, from the west, was situated the famous gold mine known as "Mina Reale," in the Cerro del Espíritu Santo, the richest that ever was worked. I read (he says) by permission of the governor, Don José de Obaldia, in the archives of the Treasury of Panama, the account for a number of years of the sums transmitted to Spain for the King's vientaro, or twentieth, from this mine (the Royal quinto, or fifth, having been reduced at an early period to 5 per cent.). They averaged upwards of 3,500,000 dollars per annum, which would give upwards of 70,000,000 dollars per annum for the whole produce; a prodigious return, considering that there never could have been many more than 300 or 400 negro slaves mining. The town, Santa Cruz de Cana, had two bakeries, a strong garrison, nine villages or missions, and many farms and hunting establishments in its vicinity; a vestige of it does not now remain. My guide, and one of the four Indians whom I employed to clear a path, were born in it, but left it with the last remnant of its inhabitants, more than twenty years ago (1850). In the course of my journey I got out of various spots, where I picked and dug, upwards of 3 lbs. of gold, 22 carats fine; and I found the soil on the banks of all the streams where I dug to be much richer than any I had met with on the branches of the San Joaquin or the river Mariposa in California, and I found several pieces of rock with veins of gold.

The Mina Reale was closed while in a high state of productiveness by order of the King of Spain, in 1685, on account of the incursions of the Buccaneers. Besides the Cerro del Espíritu Santo, several mountains in the vicinity are very rich in gold, as the San Juan, San José, Tumbasabe, Setegante, &c. &c. About the sources of the river La Marca, which is an affluent of the Tayra, about 15 miles from its mouth, and especially at Tayecua, the finest gold is procured; and on the Rio Balsas, which flows into the same river, about 3 miles above the La Marca, gold is found abundantly near the villages Camoganti and Tucuti. I found auriferous soil in many places, as at San Bartolomé, Juan Dias, Mariprieta, Pan de Azucar, &c.; gold is likewise got at Penonome, and there are very productive mines at Santiago, and Concepcion in Veragua: near Santiago, on the estate of Señor Romero, ex-governor of Veragua, the average return last December was $\frac{1}{2}$ lb. of gold for 25 lbs. of auriferous dust. During the years 1800-1804, there were introduced from the provincial treasury, from the river Concepcion and its tributaries, 2067 lbs. of gold to pay the 3 per cent. due on the produce of these washings. But none of these can compare with those of the Isthmus of Darien. The wealth which the old Spaniards derived from this isthmus, and the consequent importance they attached to it, may be estimated by the number of forts which they maintained in various parts. About Boca Chica only there are the ruins of four—the Fuerte del Principe, commanding the old road from the Pacific to the Atlantic, is situated near the head of the Tayra, about 25 miles from the gulf of San Miguel; and at Yavisa, on the river of the same name, also called the Chico, a tributary of the Chuquanaqua, is a fort large enough to require a garrison of 200 men.

The earliest settlement in South America was at Santa Maria del Darien, near the mouth of the Atrato, and from this Vasco Núñez de Balboa crossed the Isthmus, and on the 26th of September, 1513, discovered the Pacific in the gulf of San Miguel, most probably at Morro Paterio, near Plaza Guadara and the river Moguey, both perhaps named by him.

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1856.

Eleventh Meeting, May 12, 1856—continued.

2. *On Steam Communication between England, Australia, and the Cape of Good Hope.* By Captain J. LORT STOKES, R.N., F.R.G.S.

THE question of a steam packet line to Australia has been thoroughly discussed, in all its bearings, for more than ten years, and it has at length become necessary to select some one particular route without further delay. Captain Stokes urges afresh the claims of a line to Singapore, through Torres Strait. He remarks on the populous Archipelago it would traverse, its relation to the French settlement of New Caledonia, and the outlet that it would afford to the Australian squatters, who are stretching onwards to the Gulf of Carpentaria—a region which he believes to be congenial both to Europeans and to their cattle, and to offer an advantageous site for a penal settlement. He considers the dangers of Torres Strait to have been much over-rated; the passage recommended has no sharp turns, and can be navigated in the night time, except for about 100 miles. If a second steam packet route could be supported, he would recommend one from Aden to Mauritius, and thence across to Australia; it might be connected with a branch line along the east coast of Africa to the Cape of Good Hope, by way of Mauritius.

The route across the Indian Ocean, by Diego Garcia, is a little shorter than that by Torres Strait, but it crosses a hurricane track, stormy seas, and a wide extent of profitless ocean.

Sailing Directions, &c.—As rather an exaggerated notion of the dangers of Torres Strait appears to be entertained, the following details of the passage which I recommend may be acceptable:—

Ships coming from the westward should arrange to make Booby Island before daylight, and, through the tranquil seas of the Asiatic Archipelago, steamers may reckon on doing so with some certainty. To facilitate the approach to Booby Island by night, it is proposed to erect a light there; although, from its elevation, isolated position, and bold character, there is no difficulty in making it at any time. Hence the track proceeds through Prince of Wales Channel, the entrance to which is a mile in width, having a sunk reef on its northern side, which it is proposed to mark plainly by two buoys. In every other part of the track the passage is much wider, varying from 3 miles in only a very few places, to 10 and 20 miles generally, and free from hidden dangers, except in the single case of the western entrance.

On clearing Prince of Wales Channel, the course lies north-easterly between Travers Island and Double Island (7 miles apart), in the direction of Mount Ernest, which is above 750 feet high. Thence it takes a more easterly course, passing midway between Saddle Island and Ninepin Rock, where the channel narrows to $3\frac{1}{2}$ miles at a distance of 40 miles from the western entrance. The track continues nearly in the same direction, passing close to the north side of Bet Island, and midway between Dove Island, Cocoa-Nut Island, and Village Island; then it passes west of Arden Island and Rennell Island, between Dalrymple and Campbell. Six miles N.E. of the last named lies Stevens Island, at a distance of about 100 miles from Prince of Wales Channel. From abreast of this island daylight is no longer necessary, the passage lying through Bligh's entrance, between Bramble Cay and the tidal reef south of it, leaving a width of 13 miles and a depth of 22 to 26 fathoms. It is proposed, if thought desirable, to mark this entrance by a light on Bramble Cay, and a buoy near the tidal reef. The track continues eastward, passing outside Portlock Reef and the Eastern Fields, when the sea is open in the direction of Sydney. The islets which dot this part of the Strait, are so bold, that they, of themselves, quite beacon the passage. Sail may be carried through the greater part of it in either monsoon. In making the eastern entrance of Torres Strait, the lofty mountains of New Guinea may be seen forming a safe landfall; and the greatest comfort to the navigator is the singular shelving nature of the bottom fronting Bligh's entrance. Throughout the Strait the direction of the track ranges only between E. and N.E., or W. and S.W., without any sharp turn. The streams of tide set fair along it, with a moderate and even depth of water throughout, and the navigation is the easiest that it is possible to imagine through a coral sea. For 100 miles only is daylight at all necessary.

As it will be requisite to have a coal depôt in Torres Strait, the party in charge might superintend the lights, buoys, and also the pilotage that may become desirable. The coal may be conveyed from the mines near Sydney to this depôt, with a degree of ease and economy that can never be attained on the southern route; this is owing to the number of ships which proceed from Sydney in ballast, through Torres Strait to India.

SIR R. MURCHISON, F.R.G.S., having briefly alluded to the first portion of the able memoir of Captain Stokes on the capability of navigating through Torres Strait by steam packets, begged to say that he (Sir R. M.) took the deepest interest in the other object of the author, viz., the establishment of a colony at the head of the Gulf of Carpentaria. He had formerly pressed the consideration of this measure upon the attention of H. M. Colonial Secretary, the Duke of Newcastle. He felt certain that the settlers in New South Wales (who had already stretched far to the north of Moreton Bay) would, ere many years, reach the Gulf of Carpentaria; and if, in the mean time, a settlement and port were formed there by convict labour, we should thence have a safe and certain route to the Indian Seas, avoiding the risks of Torres Strait, and rendering a number of worthless men useful in connecting the interests of our distant colonies.

MR. CRAWFURD, F.R.G.S., could not see any objection to the route proposed by Captain Stokes, and thought it the best that could be adopted. The interest of Australia was as completely identified with India and the Indian Archipelago as with England itself, independent of the great population of British India and of China and the countries between. There was within the Strait of Malacca and close to Australia a population of 250,000 persons. The imports and exports of these alone already amounted to 10,000,000*l.* sterling. Java had 10,000,000 of inhabitants, and trade might be indefinitely extended in this direction. The route by Torres Strait is that desired not only by the majority of the Australian colonies, but by all parties in India. It may or may not be, by a few days, longer than some others, but it is unquestionably that which will pay best, be most cheaply kept up, and confer the most immediate and largest benefit.

He had, however, serious objections to make to some statements in Captain Stokes' paper. He thought the French would have great difficulty

in dealing with the inhabitants of New Caledonia, who were a stout, savage, negro race, and rather warlike, inhabiting a tropical region little adapted to the European constitution, and he could not suppose the Gulf of Carpentaria had a climate suitable to European constitutions, nor could he see anything to induce English settlers to select that locality. It was within 18° of the Equator; and in his opinion, had neither climate, soil, nor water to recommend it. Wheat could certainly not be grown upon it, and it was totally unfit for sheep.

CAPTAIN ROSEASON, R.N., cordially concurred in Capt. Stokes' opinions on the navigation of Torres Strait. He had steamed through the strait himself, and had no doubt of its being the best route from Sydney to Singapore. But for postal communication he preferred the Panama line.

CAPTAIN FITZROY, R.N., F.R.G.S., hoped that the discussion would be confined to the question of the most suitable postal route to Australia. This was a matter for the *present* time, but no one could expect to see a canal cut through the Isthmus of Darien in less than 10 years.

He thought that the sketch map which had been used to illustrate the paper, should have shown the direct route from the Red Sea and Cape Leeuwin by the Chagos Islands, as well as the two other lines. This direct track had been objected to on account of hurricanes, but ships were not now deterred from crossing those seas on that account. To steam ships of 2000 or 3000 tons, occasional hurricanes were a mere bugbear. Many years ago we used to hear often of ships being lost in hurricanes, but the improvement in building and fitting ships, and our knowledge of the rotatory motion of these storms, had divested them of much of their danger. This direct route lies across an open sea, through which ships may run, if they please, 20 miles an hour by night as well as by day, and the winds by no means so strong as in the Atlantic. The chief difficulty in making sailing passages from Cape Leeuwin to the Mauritius, is found in the light winds, and returning in the opposing S.E. trades, which, however, he thought, might be considerably lessened by a slight alteration in the course taken.

The route through Torres Strait might be smooth and pleasant in summer, but could Captain Stokes say what it is in winter? Captain Lihou had told him, five and twenty years ago, that he had tried to work his ship through, against the westerly monsoon, that he had got her aground frequently, and that nothing should tempt him to try that passage again in winter. This had made a great impression on him at the time, and since then evidence on the navigation of Torres Strait in winter had been unattainable. It is almost, if not altogether wanting. All our information related to the summer season, and even then vessels would be obliged to anchor during the night, for several nights in succession. This route was not, in his opinion, fit for large steamers, and the passages would necessarily be slow on account of many stoppages and delays. Long runs are required for speed. In an economical point of view it would not do to stop often.

But in his opinion two or three lines would be required—one round the Cape of Good Hope, as well as that through the Red Sea; and both these would open important branch lines, but these branches must not be considered when rapid passages are desired from end to end. There would be immediate ample support, as there was unquestionable necessity, for two lines at least; and the quicker those could be made, the more numerous would be the branch lines which—as we know by experience on railroads—would immediately be opened. Until Captain Stokes could show that the climate of Torres Strait offered no great obstacle in winter, he should prefer the Chagos route for the mails, and for those passengers who preferred the shorter, though more expensive route; other lines would of course be cheaper for the generality of passengers and for cargoes.

For the wants of North Australia, connection with Singapore was required.

One route would undoubtedly help out another, and both lines would—in his opinion—be soon in operation if the Government would give its attention to so important a subject.

After some remarks and questions from the BISHOP of OXFORD having reference to a penal settlement in Carpentaria, the discussion on Captain Stokes' paper was adjourned to the next ordinary Meeting.

Twelfth Meeting (ANNIVERSARY), 1 P.M., May 26, 1856.

The President, REAR-ADMIRAL F. W. BEECHEY, in the Chair.

The Minutes of the previous Meeting were read and confirmed. The Regulations respecting the Anniversary Meetings were next read, when the President appointed Dr. W. B. Baikie and John Brown, Esqrs., Scrutineers for the Ballot.

Blackett Botcherby, Esq., was proposed as a Candidate for Election at the next Meeting.

The Report of the Council, with the Balance-sheet for 1855 and the Estimate for 1856, was then read and adopted.

The PRESIDENT next delivered the Founder's Gold Medal to his Excellency G. M. Dallas, the American Minister, on behalf of Elisha Kent Kane, M.D., of the United States, for his discoveries in the Polar Regions while in command of the American expedition in search of Sir John Franklin and his companions, and for his Memoir and Chart.

The Patron's Gold Medal was presented to Heinrich Barth, PH. DR. of Hamburg, "for his Explorations in Central Africa; his numerous Excursions about Lake Chád; his discovery of the River Binnué; and his Journey to and from Timbuctú."

A Silver Watch and Chain was then presented to Corporal Church, of the Royal Sappers and Miners, for his meritorious and intelligent services in connection with the Central African Expedition.

Corporal Church having been introduced to the Meeting by Lieut.-General Sir John Burgoyne, R.E., received the Watch and Chain through his hands.

The PRESIDENT then read his Anniversary Address, for which a unanimous Vote of Thanks was passed, with a request that he would allow it to be printed. The Ballot being concluded, the Scrutineers reported that the changes advised by the Council had been adopted; and the President announced that Colonel W. H. Sykes was elected to succeed Rear-Admiral W. H. Smyth as Vice-President; and the Right Hon. E. Cardwell, M.P., Captain R. FitzRoy, R.N., Lieut.-Gen. C. R. Fox, the Earl of Harrowby, Lieut.-Gen. Sir G. Pollock, H. D. Seymour, Esq., M.P., and Captain J. L. Stokes, R.N., were elected to fill the vacancies in the number of the ordinary Councillors occasioned by the retirement of Rear-Admiral Sir F. Beaufort, W. Cotton

Oswell, Esq., Lord Overstone, Earl Somers, Lord Stanley, and Sir Gardner Wilkinson.*

The Thanks of the Meeting having been voted to the President, Vice-Presidents, Members of the Council, Auditors, and Scrutineers, the President finally directed the attention of the Meeting to the usual Anniversary Dinner, and the Meeting adjourned at 4 P.M.

Thirteenth Meeting, June 9, 1856.

SIR RODERICK I. MURCHISON, VICE-PRESIDENT, in the Chair.

Hon. Thomas Powys; Captain Frank Vardon; Blackett Botcherby, M.A.; Thomas Browning; John Torrance; and Robert White, Esqrs. were elected Fellows.

Attention was called to the arrival of Captain Byron Drury, R.N., F.R.G.S., of H.M.S. 'Pandora,' from the Australian station, with surveys; and to a letter which had been received from Dr. Sutherland, announcing that he had just returned from an exploratory tour in the Quathlamba range of mountains in Natal, and hoped soon to send the results of his observations.

The discussion on Capt. Stokes' Paper on Steam Communication between England, Australia, and the Cape of Good Hope, which had been adjourned at the Meeting of the 12th of May, was continued.

THE CHAIRMAN, in inviting discussion upon the paper, said, that at the previous ordinary Meeting (May 12th) certain objections had been raised in reference to the establishment of a penal colony in the Gulf of Carpentaria, it being apprehended that the climate was too hot for the abode of Englishmen. Captain Stokes had however stated, not only on his own observations but also on those of Flinders and Leichhardt, that the temperature was not too high, and that the country was healthy and fertile. Supposing this view to be correct, there could be no reason why a penal establishment should not be made there, the more so when it was recollected that the head of the Gulf of Carpentaria was more than 400 miles farther from the Equator than Port Essington, where a British station was maintained for many years. A port being formed by convict labour at the head of the Gulf of Carpentaria would, in a very few years, prove to be of incalculable advantage to the northernmost settlements of New South Wales, and our East India and Chinese dependencies, as the risks of Torres Strait would be obviated, and a clear and safe line of navigation would be opened out.

THE SECRETARY then read a letter from Capt. Stokes in answer to questions that had been raised by the Bishop of Oxford and others at the previous Meeting. He stated that the evidence on the subject of climate was remarkably complete, considering the hitherto unoccupied state of the country. Captain Flinders explored the gulf during the summer months, from November to March, and he observed the temperature to vary at that season, when the heat is greatest, from 81° to 90°: "the weather," he states, "was consequently warm, but being alleviated by almost constant breezes, either from

* The President's Address in full, will be issued as 'PROCEEDINGS,' No. V.—ED.

sea or land, it was seldom oppressive." This evidence is confirmed by observations taken daily, at sunrise, noon, and sunset, during the months of November and December, in Weymouth Bay, York Peninsula, by Mr. Carron.

For the temperature of the remaining part of the year, or from April to November, there is the evidence of Dr. Leichhardt, who was engaged with a party during three months in traversing the southern shores of Carpentaria. He speaks very highly of the country, and describes the influence of the climate on himself and his companions in these words:—"The state of our health showed how congenial the climate was to the human constitution, for without comforts, without flour or salt, and miserably clothed, we were yet all in health." (Page 299.) As to his cattle, he states that they were in capital condition while passing round the gulf; and further, that cattle, driven by easy stages from the Darling Downs to the Gulf, would fatten on the road.

Captain Stokes' own surveys in Carpentaria, which led to his discovery of the fine country which he named the Plains of Promise, were made during the months of July and August, and were perfectly confirmed by Leichhardt's subsequent journey. The thermometer in those months was observed as low as 50°; and Leichhardt, in drawing the special attention of his readers to the frequent complaints made by his party of cold nights, says, "in fact, we found the air so bracing that we are all in good health." Captain Stokes expressed the opinion that a selected class of convicts might be employed on a system of dispersion, with great advantage, in forming a new settlement in the Gulf of Carpentaria.

With regard to the thick, rainy, and boisterous weather, which Captain FitzRoy seems to fear would impede the navigation of Torres Strait during the western monsoon, it does not appear, from all the evidence Captain Stokes had been able to collect, that there was any cause of apprehension. Thunder squalls occur with rain, but the strongest winds, Flinders found during the season of the westerly monsoon, were from the eastward.

It would almost appear that, perfect as our charts now are along the proposed route, there must be some motive in continuing the brand of great danger to the navigation of Torres Strait. The losses that have occurred on the Barrier Reefs may be attributed to hazardous attempts to make Raine's Islet and similar narrow passages, where there are no soundings to guide the navigator, and the currents are generally strong.

Captain Hoseason is the only naval officer who has taken a steamer through Torres Strait. He was delighted with the passage, and compared the reefs and islets to so many natural beacons, as he steamed H.M.S. 'Inflexible' through them at the rate of 10 knots an hour.

An increase has been made in the subsidy from Melbourne, raising it to 75,000*l.*, since this subject was brought on at the last Meeting; rendering it still more apparent that there should be two lines, as already stated; one to Melbourne by the S. coast, and the other to Sydney by Torres Strait. This would allay agitation, and meet the wants as well as gratify the wishes of all the colonists.

CAPTAIN THE HON. H. A. MURRAY, R.N., F.R.G.S., next read a letter from Captain J. C. Hoseason, R.N., who was unavoidably absent, and who expressed himself in favour of Captain Stokes' route *viâ* Torres Strait, *not* as being the best line of communication from *England* to Australia, but as being the best line across the Indian Seas, supposing that it was determined, in the first instance, to send the mails by way of *Suez*. As a means of direct communication between England and Australia he gave a decided preference to the route *viâ* Panama, using the railroad, such as it now existed, across the Isthmus; but if hereafter an inter-oceanic canal should be constructed free from locks, and navigable for large steamers, that route would in his estimation be incomparably superior to all others.

Captain Hoseason mentioned that he had been for three years Nautical

Director of a large company established to carry out the Panama line at so early a period, that nothing but the Russian war, and the consequent high rate of interest for money, stopped its proceedings.

Captain Hoseason also wished to call the attention of the Society to the fact that the railroad has been finished from sea to sea for more than 12 months; that it is only 49 miles in length; that 700 or 800 passengers are carried across in about three hours; and that the passengers and mails which arrive in Navy Bay from New York in the forenoon, are carried across and sail from Panama to San Francisco, or to Peru and Chile, in the evening of the same day. Also that about 70,000 passengers and 12 millions sterling of specie were carried over the Isthmus last year; that the trade is now most rapidly increasing, and that cargo of all kinds is being carried across; valuable goods, common mercantile goods, such as coal, hides, ice; in fact, any thing and every thing. Anthracite coal in large quantities is now sent direct to the Pacific from New York *via* Navy Bay and Panama. Five enormous steam lines concentrate at the Isthmus of Panama alone; two from America to Navy Bay, the Royal West India Mail Company, an American line from Panama to San Francisco, and the English Pacific Company to Peru and Chile.

All these facts, as well as the peculiar advantages which the Panama route offers, owing to favourable winds and moderate weather, are fully detailed in a pamphlet now in possession of the Society, which is addressed by the directors of the Australian Direct Steam Navigation Company to Lord Canning, then Postmaster-General, and which had chiefly been compiled by Captain Hoseason and his late colleague, Captain A. S. Hamond, R.N., both of whom have had considerable experience in those seas while in command of war steamers; the former officer having run his vessel upwards of 70,000 miles, during which time he daily chronicled those oceanic phenomena which entitle his opinion to so much weight.

MR. J. CRAWFORD, F.R.G.S., said that he believed the climate of the southern portion of the Gulf of Carpentaria to be unfavourable. The country was not a tableland, but was almost at the sea level, certainly nowhere 300 feet in elevation. No person who had been in such a country within the tropics could believe it to be one in which Europeans could labour. The lowest temperature of winter was 50°, while the heat of summer was excessive, amounting to 89° or 90°, being 5° or 6° greater than the very Equator. Besides this no distant mountains had been discovered, and consequently no water applicable to irrigation. On comparing the country with one of which much had been lately said, Central America, the great advantage of the latter over it would be evident. Instead of a lowland, Central America presented a tableland rising to a height of 3000 up to 8000 feet, thus giving lands at all elevations fit for the growth of every kind of produce. In addition to this, much of the land was volcanic, and therefore was pretty sure of being fertile. He consequently persevered in saying that the Gulf of Carpentaria was totally unfit for European labour.

CAPTAIN STOKES, R.N., F.R.G.S., believed that the supply of water was good, as Leichhardt had crossed numerous streams there, in addition to those which he had himself previously discovered and surveyed. The existence of highland had not been proved to the southward of the gulf, but it had been certainly found both eastward and westward. From the observations of Flinders during the summer months, from November to March, he believed that the heat was not oppressive; and the evidence of Leichhardt was conclusive as to the healthiness of the climate.

MR. HOVELL, F.R.G.S., who had been forty-three years in Australia, and made the first overland journey to Port Phillip in 1824, entered into the question of convict-labour, stating his belief that transportation, and assignment of convicts to private service, was the most humane mode of punishment that had ever been adopted. He believed that the climate about the Gulf of Car-

pentaria was very good, though he had never been nearer to the district than Torres Strait.

MR. G. F. LESLIE, F.R.G.S., referred to the question of steam communication. It was the wish of the Australian colonists to have a speedy, direct, and immediate communication with England by the shortest route. The island of Diego Garcia, which had been proposed as a coal station, presented several drawbacks, since, before it could be so used, lighthouses and coal depôts must be constructed. As considerable time would thus be taken to prepare it, this plan must for the present be set aside, the requirements of the colonies being immediate. The selection of either of the islands of Mauritius or Ceylon seemed to be a matter of indifference, since the route by either would be about the same. It had been shown that the expense need be no obstacle, as the sum of 50,000*l.*, and afterwards an additional sum of 25,000*l.*, had been voted by the colony of Victoria towards this object. A like sum, which the Imperial Government had proposed to give, places 150,000*l.* at immediate disposal, and this will be found quite sufficient. With reference to the route by Torres Strait, he agreed with Captain Stokes that it would be the most direct; and if the selection would not be attended with the same disadvantages as that by Diego Garcia, viz., the necessity for lighthouses and buoys to mark out a safe passage, he had no hesitation in saying that it would be by far the best. There were some reasons why the preference should be given to the Mauritius route, because then the Cape of Good Hope could be connected with the line, which would be a great benefit to that colony. The Atlantic had been ploughed, both in winter and summer, at the rate of ten knots an hour, and therefore he concluded that the Indian Ocean might be traversed with the same speed. Should a line of communication be established from Australia to Ceylon, and from thence to Suez, he believed that within twelve months it would be found requisite to establish an independent line through Torres Strait to Singapore, to meet the requirements of the commerce between Australia and India, which is very extensive and daily increasing.

With reference to the establishment of a penal colony on the Gulf of Carpentaria, he thought it would be most injudicious, and certainly most distasteful to nine-tenths of the Australian colonists. He had experience in the assignment system for several years before its termination, and believed it to be in many respects most iniquitous. Another objection he conceived to be the fact, that within the last five years the colonists had penetrated with flocks and herds from Wide Bay to within 600 miles of the gulf, and that during the next five years they would reach it. He would propose instead, that the neighbourhood of the Victoria River of Stokes should be chosen as the site of a new penal settlement. It was, he believed, fertile, and suited to the growth of cotton.

COLONEL EVEREST, F.R.G.S., agreed with Mr. Crawford in the main in his objections; but he observed that climate does not depend merely on the distance of a place from the Equator. He would refer to the case of St. John's in Newfoundland, where even oats would not ripen, although it was several degrees nearer the Equator than London. He thought it would be better to determine, before proceeding farther with the question of a penal settlement, whether the elevated land supposed to exist in the vicinity of the gulf was real or imaginary.

2. *Remarks on the Isthmus of Cupica.* By Admiral ILLINGWORTH.

Communicated by ROBERT STEPHENSON, Esq., M.P., F.R.G.S.

IN the commencement of the year 1820, and during the war of Independence in South America, the then Captain and afterwards Admiral

Illingworth, of the Colombian service, crossed the isthmus of Cupica at the head of a party of seamen and marines belonging to a sloop of war under his command. He descended by the river Napipi into the Atrato, the object of his expedition being to assist in the capture of some Spanish gun-boats, which had been sent from Carthagena to invade the towns situated at the head of the Atrato.

The better to effect the purpose of his expedition and to capture canoes for embarking his men on the Napipi, Admiral Illingworth caused a six-oared boat to be carried up the eminence which rises some 200 feet above the level of the sea, behind the bay of Cupica. From that position the course of the river Napipi can be clearly discerned; and were it not for the impenetrable forest which descends thence to the valley of the Atrato, this deep and splendid Atlantic stream might be fully traced by an observer stationed on the hills in question, above the bay of Cupica.

Admiral Illingworth's boat was dragged for about six hours' march on foot along the Indian path, which, leaving the bay of Cupica, reaches the river Napipi in a direction almost at right angles to its course, at a point where boats and canoes can navigate it even in the dry season.

Admiral Illingworth in his boat, and his men in canoes, proceeded to the only farm to be found on the Napipi, and starting thence early in the morning, he arrived in the river Atrato about nine or ten o'clock A.M., the Napipi being in its lower part a deep and winding stream.

After having fulfilled the objects of his expedition, Admiral Illingworth left his boat in the Atrato, at the solicitation of the Governor of the province; and as it was the first vessel known to have passed from one ocean to the other, it was preserved for many years under a shed, in the town of Citará, as a curiosity.

There is also another point worthy of attention in that section of the isthmus of Panama, namely, the very narrow neck of land which divides the head of the Atlantic river Atrato and that of the St. John's River, which descends into the Pacific in about 4° N. lat., that is to say, about 100 leagues to the south or windward of Panama. The Indians, as well as merchants, drag their canoes from one river to the other with great ease, and indeed a sort of canal is formed by this constant operation, which is called "el Canal de la Raspadura." It is moreover stated by the Indians in that part of the country, that a very easy communication is to be obtained between Baudó, an Indian town on the Pacific, and the Atrato.

3. *Survey of the Isthmus of Darien, between the Gulf of San Miguel and Caledonia Bay.* By LIONEL GISBORNE, M.A., C.E., F.R.G.S.

THIS is the second expedition to Darien, of which Mr. Gisborne has had charge. The object of both was to examine the country between San Miguel and Port Escoces, and the results of the first are published in vol. 23 of the Royal Geographical Society's Journal. Owing to the continued hostility of the native Indians, he believed that no party, since the time of the Buccaneers, in 1684, had ever obtained a footing in the country, with the exception of Milla's; Patterson's; and his own.

Mr. Gisborne's expedition was commenced with the co-operation of the Governments of England, France, America, and New Granada, which sent officers to report on the results of the survey, and stationed ships to protect the explorers. A first attempt showed that success was impossible to the very large party with which Mr. Gisborne started; he returned to the ships, and then, accompanied by Lieut. St. John and two sailors, and guided by Indians, he ascended the Caledonia River, crossed the Cordilleras, went some distance down the Sucubdi River, and then, striking N.W., reached Mr. Forde's head-quarters on the opposite side of the isthmus. An attempt to recross by another route proved unsuccessful. He relates the disasters that befell two parties who started a very short time before his own, those of Capt. Prevost and of Lieut. Strain. At the request of Mr. Gisborne, a boat was despatched from H.M.S. 'Virago' in search of the survivors of the latter party, who were discovered, after five days, in a most deplorable state of destitution.

The result of Mr. Gisborne's survey shows that the harbours of Caledonia and Darien are excellent, and in every way adapted as the termini of an inter-oceanic canal. The coast on the Atlantic side was found to be seven miles wrongly laid down in longitude, and a range of mountains, from 900 to 1600 feet high, was proved to form the parting of the country at a distance of about five miles from the Atlantic. This water parting is precipitous, being, at a distance of five miles westward, only 200 feet above the mean level of the oceans. The distance between tidal waters on opposite coasts is under 30 miles. A track chart of the Chuquanaque has been made nearly as high as the Loma Deseada, at the confluence of the Sucubdi, which agrees in a very remarkable manner with the copy of the map made to show Milla's route in 1787-8, a tracing of which was given to Mr. Gisborne by Colonel Codazzi. The result of this last survey is demonstrative of the fact that canalization across, without tunnelling, is here impracticable; but it also proves that a railway might be constructed between excellent ports not above 12

leagues apart, with a summit level, to be crossed, not exceeding 300 yards above the sea.*

Mr. Gisborne remarks, with reference to the practicability of a complete survey of the isthmus, before deciding on a line for making an inter-oceanic canal, that "wherever the best spot may be, two elements must necessarily exist—good harbours (or the means of making them) and a short distance. This limits the inquiry to a very few places, and those can be reduced to two or three by a cursory examination. Two surveying vessels on each coast could in a few months examine the unsurveyed portions of Central America sufficiently to decide where good harbours, or facilities for making them, exist. It is not probable that many such places will be found opposite each other; where such is the case, a general examination of the interior would soon eliminate the impossibles, leaving perhaps two or three places where a more careful and detailed examination may be necessary."

DR. HODGKIN begged to introduce to the Society, General Mercer, of the United States, who had been the chairman of a committee for reporting on an inter-oceanic communication through Central America.

GENERAL MERCER said that his friend Dr. Hodgkin had taken him entirely by surprise in mentioning his name; but being invited also by the Chairman of the Meeting, however incompetent, for many reasons, to cast any additional light on the subject under debate, he would not resist the compliment paid him. More than eighteen years had elapsed since the duty had devolved on him, as a member of a standing committee of the House of Representatives of the United States of America, to make a report to that body, on a memorial from certain citizens of New York and Philadelphia, on the practicability and mode of providing for the construction of a navigable ship canal between the Atlantic and Pacific oceans.

He had despaired of obtaining, through any channel then accessible, the facts necessary to guide even his own opinion upon a subject of the importance of which he had long been aware, when he accidentally found, in a work on Guatemala, by a British official agent, a table furnishing the distance, and a series of levels taken at every hundred yards of the intervening high land between Lake Nicaragua and the Pacific Ocean. From this it appeared that the distance overland, was but 17 miles and 350 yards; and the elevation of the surface of the lake above the Pacific but 134 feet; that for 9 miles from the ocean, the ground regularly descended towards it from the level of the lake, over a surface in all respects favourable for a canal of any dimensions. For the 8 miles next to the lake, serious difficulties, although not insurmountable, were presented, in the elevation of the ground, often rock, above the level of the lake, to heights averaging, for 6 miles, more than 60 feet; for 2 miles of that distance, 135 feet; and for one-third of a mile, 150 feet.

General Mercer said, that the canal was designed by him, to have a depth of 26 feet, the draught of a large frigate; but was enlarged, at the suggestion of the United States engineers, to a depth of 30 feet, with a breadth sufficient to permit two of the largest ships to pass each other.

The deep cutting from the lake to the Pacific, was not unexampled, even in Mexico. But supposing a tunnel to be dispensed with, and its continued depth extended for several miles more than that example warranted, yet it involved only an additional cost. He did not hesitate, therefore, in inducing the com-

* See Map to accompany Capt. Prevost's paper, in vol. xxiv. p. 256.—Ed.

mittee to report in favour of the practicability of uniting Lake Nicaragua with the Pacific, and using the Lake as a feeder, if not embraced in the direct communication with the river St. Juan, which was navigable to the Atlantic at most seasons of the year, by vessels of shallow draught.

He did not believe, as the Lake was of great dimensions—not less than 200 miles in circumference, and if shoal in some places, in others deep enough for ships of any size—that it would fail of supplying a sufficient quantity of water for a constant navigation, by means of locks, from sea to sea. The use of it for twenty-four hours would not, he believed, reduce the level of its surface 2 inches, if in that time it received no supply from Lake Leon, which lies N. of it, and disembogues the water, received from various streams, into Lake Nicaragua, by a river of rapid current.

Assuming it as a universal truth, that wherever there is a perpetually descending navigable river, supplying a sufficient quantity of water for a navigable canal, such a canal can be made, the Committee of the House of Representatives, without other data, deemed the whole line of navigation for the largest ships, from the Pacific through, or by, Lake Nicaragua and down the St. Juan to the Atlantic, practicable. Of the cost of such a work they could pronounce no judgment. Of the quantity of materials of earth and rock to be removed, in order to open that part of it, in which a line of levels had been supplied by Thompson's work on Guatemala, they were furnished with a hasty estimate by the Topographical Bureau of the War Department of the United States, which made it with no other assistance, than from the cross-section of the ground which the canal would pass on the line already surveyed. Those materials exceeded 44 millions of cubic yards.

From the profile of the entire line, and information derived from the construction of a canal of 186 miles, leading from the city of Washington, along the river Potomac, through many lofty mountains, the Chairman of the Committee, availing himself of further information as to the general aspect of the country between the Lake and the Pacific, was led to compute the cost of so much of the line of proposed navigation, at 20 millions of dollars, or about 4 millions of pounds sterling. This, he admits, was rather a guess than an estimate; but he entertained no doubt of the practicability of the construction of the entire work, for a sum much less than its value, which is beyond all computation.

General Mercer said, that he brought with him to Europe, near three years ago, two copies of the Report of the Committee on Roads, Canals, and Internal Navigation of the year 1838, on this subject. He despaired, on account of the then existing war, of being able to use it with any practical effect, although the construction of the canal, with only one other object of public interest, had led him, at a very advanced age, to make a seventh voyage across the Atlantic since the commencement of the present century, having made his first in 1802.

Great Britain had a much deeper interest than France, in uniting with America, in constructing the proposed canal. It has been rumoured, not without circumstantial evidence of its truth, that an effort is to be made, which, if made, will doubtless be successful, to unite the Red Sea with the Mediterranean, by a canal through the Isthmus of Suez, where, it is believed, a canal formerly existed. If successful, one effect of it will be obvious, that France, Austria, and Russia, Italy and Greece, will be on the water line of communication between England and her possessions, from 1500 to 2000 miles nearer to those possessions, than she will herself be. It is therefore much to her interest to shorten, if practicable, her distance from them, by way of the Atlantic and Pacific, by uniting those oceans as now proposed.

In the Appendix to the Report of the Committee, occupying 160 pages, reference was made to the history of several companies formed for the execution of the Nicaragua and other lines of inter-oceanic communication across the

Isthmus of Central America. The Report recommended the survey of one of them, near which a railroad has since been constructed. It furnished the Holland contract for that through Lake Nicaragua, to which the King of Holland subscribed half a million of guilders. This subscription was abandoned, the subsequent severance of Belgium from Holland having proved fatal to the renewal of the efforts of the Dutch to execute this work; and at present it is probable that, without the interposition and some concurrent arrangement between the Governments of those States most interested in its execution, it may yet be long delayed, if ever executed. Before he concluded, General Mercer begged to observe that he owed it to Mr. Kelley of New York to say, what we must all think, that if, by an open cut from sea to sea, and the Atrato and Truando rivers, a navigable canal of the dimensions which he proposes can be constructed, it is greatly to be preferred to any communication between those oceans by locks; for, however they may be multiplied and provided with intervening pools of water, of sufficient dimensions to facilitate and hasten the passage through them of very large ships, it may be questioned whether there would not be very inconvenient delay often incurred, and the utility of the entire line of intercommunication be impeded, by the number of vessels seeking a passage through the locks. The only doubt that as yet appears to hang over the Atrato route, arises from the possible insalubrity of the country through which it is to pass.

A VISITOR having asked General Mercer if the climate on the Nicaragua route would be unhealthy, he answered, that it was probable that it would not be so, as several considerable cities existed in its vicinity, and a road through it to the Lake and the river St. Juan had been, for several years, used for the transit of persons and property passing between the States of Oregon and California, both to and from the United States, without a complaint or a suggestion having been heard that the climate is unfavourable to health.

He acknowledged the inquiry to be most pertinent, as ill health would constitute a very serious impediment to the progress of a work so laborious, and would greatly enhance its cost. He had heard it said at New Orleans, that the very beautiful road between that city and Lake Pontchartrain, was made of oyster-shells and Irishmen.

THE CHAIRMAN, in conclusion, said that these propositions of American citizens, were in every way entitled to the consideration of the Society, especially that which had been made by Mr. Kelley, and to which General Mercer, of the United States, gave the preference over the Nicaragua route, as examined by himself. It was most important to bear in mind, that Mr. Kelley came from America, chiefly for the purpose of inducing the English and French Governments to unite with the American authorities in a great joint geographical survey of the whole of the Darien territory, with the view of finally determining upon the best line for the construction of a great canal without locks, and by which the largest vessels might pass.

He heartily wished that Mr. Kelley might succeed in this great and philanthropic project, which so deeply interested all civilized nations.

Fourteenth Meeting, June 23, 1856 (last Meeting of the Session).

REAR-ADMIRAL F. W. BEECHY, PRESIDENT, in the Chair.

Messrs. W. Ferguson, John Torrance, and H. J. Williams were officially introduced upon their election.

Professor P. A. Munch, of the University of Christiania, was, upon the recommendation of the Council, elected a Corresponding Member;

and Messrs. Daniel Brown; Samuel Brown; A. Henderson; P. C. Lovet; A. Macgregor; and W. R. O'Byrne; Capt. John Shepherd, R.N.; Sir J. P. Kay Shuttleworth, Bart.; Messrs. K. L. Sutherland, R.N.; G. C. Taylor; and Lieut.-Colonel F. E. Wilmot, R.A., were elected Fellows.

Messrs. J. B. Heath; Arthur Hodgson, of Australia; W. H. Hovell, of Australia; W. P. Andrew; Capt. Cole; Messrs. J. Entwisle and G. K. Fairholme; Colonel the Hon. A. H. Gordon, C.B.; Sir Charles Nicolson, of Sydney; Commander Montagu O'Reilly, R.N.; and Mr. William Staniland, were proposed as candidates for election at the opening meeting of the next session.

An ancient Atlas and Portulan of Spain were exhibited by Sir Thomas Phillips, F.R.G.S.; also the new edition of Baily's Map of Central America, by Mr. Stanford, F.R.G.S.

The Papers read were—

1. *Journey of Joachim Rodriguez Graça to the Muata ya Nvo.* By
W. D. COOLEY, Esq., F.R.G.S.

MR. COOLEY endeavours to establish the position of the Muropue's (Muata ya Nvo) capital, and he collates the itinerary of Graça, who travelled in 1843, with those of Lacerda, Texeira, and the Pombeiros, or native travelling merchants. Finally, he examines critically into the information collected by Dr. Livingston about the courses of the several rivers which he crossed, and disagrees widely from him.* He places the capital of the Muropue at about 8° S. lat. and 22° E. long.

2. *Letter from Dr. Livingston, with a Sketch Map.*

THIS letter was dated Cabango, Lunda country, May 17, 1855. Its object was to make certain corrections in his first map of the country adjacent to the Quango, through which he had passed in very cloudy weather on his outward journey, which corrections of Dr. Livingston had all been attended to by Mr. Arrowsmith in engraving the map which accompanies his paper in the lately-issued volume of the Royal Geographical Society's Journal, and it is, therefore, unnecessary to notice them at length.

In reference to these papers MR. MACQUEEN pointed out that the subject of them was the same as that of the latter part of his paper of December 10, 1855, which was only partially read to the Society, but in which he had arrived at very different conclusions from Mr. Cooley. He had consulted everything he could find upon the subject, including the autho-

* At the time of writing his Paper, Mr. Cooley had not seen Dr. Livingston's last communication.—ED.

rities from which Mr. Cooley had formed his opinions, and he believed that that gentleman's views were quite erroneous. He conceived that the main direction of the streams in question was to the N.E., and not to the N.W. Of these the Casai was one of the most important, and it certainly ran to the E., and not to the W., as Graça says. This view was confirmed by the reports of the Arabs who crossed from Benguela to the East Coast. Dr. Livingston deserved the greatest credit for the correction he had made. The difficulty in making observations in a country like this was immense, and it is only a matter of wonder that he has made so few mistakes. No traveller had done so much for African geography as Livingston, and he hoped that this country would not allow him to go unrewarded.

SIR RODERICK MURCHISON paid a tribute of respect to the merits both of Mr. Cooley and Mr. Macqueen for their great labour and research. He was sure that the Society could but hope that the report of Dr. Livingston's safe arrival at Teté* was true. That remarkable man was the only European who had traversed and retraversed South Africa; he was not merely an explorer, but a scientific observer; and the accuracy of his statements was well known. Sir R. Murchison therefore believed that Dr. Livingston would have among geographers, a reception fully as warm as that given to General Williams by the British nation.

MR. GALTON cordially joined in the expressions of gratitude offered to Dr. Livingston on behalf of African geography, for he had made a certainty of so many important questions that had before been matters of pure speculation. Members of the Society were aware that an expedition would probably be sent before long to Eastern Africa, and he thought it due to the just appreciation of any discoveries it might make, that geographers should take note of our present state of exceeding ignorance about the whole interior of that continent, notwithstanding that so much learned and ingenious labour had been spent in endeavouring to determine it. He would simply beg the Society to glance at three maps which were hung in different parts of the room in which they were assembled: two of them represented the respective opinions of Mr. Cooley and Mr. Macqueen, two of our best informed African geographers; the third was the compilation of Mr. Erhardt, from most abundant native testimony; and yet these three maps were as utterly dissimilar and discordant in all their physical features as it was well possible to imagine.

THE PRESIDENT said that all would concur with Mr. Macqueen as to the difficulty of making observations in a country like Africa, where not only the land itself, but the climate also, was so much against them. The observations of Dr. Livingston had been submitted to Mr. Maclear, the astronomer at the Cape, and had been highly approved of by him.

He would here say a few words on the expedition to Eastern Africa referred to by Mr. Galton. The expedition was to start from the East coast, and to explore the region of Lake Nyassi, and the country between it and the Indian Ocean. The Lake was, according to Mr. Erhardt's estimation, 600 miles in length, by 300 in breadth. The district around it abounded in copper, and was thickly populated. Since Mr. Erhardt's paper was read, the Council of the Society had been in communication with the Government respecting an expedition to the country, which, if it took place, would be conducted by men of enterprise.

* Report received from Mr. Sunley, writing from Mozambique.—ED.

3. *Routes between the Danube and the Black Sea at Kustendji.* By Captain SPRATT, R.N., C.B., of H.M.S. 'Spitfire.'

Communicated by Captain J. WASHINGTON, R.N., F.R.G.S.

THIS communication was written at the outbreak of the war, but has been received only a few days since by the Society. Captain Spratt considers the lakes along the Kara Su valley to be a mere backwater of the Danube, and that they could be fitted for the navigation of barges without much difficulty. The remaining twenty-three miles, to the Black Sea, might be traversed by carrying the barges on wheels along a tram-way to the sea at Kustendji, where a breakwater would have to be constructed to shelter them. The absence of any port at that place would render an ordinary ship-canal between the Black Sea and the Danube of little value. Captain Spratt gives itineraries of the routes as they exist at present, and remarks on the value of Kustendji in a military point of view.

4. *The Landfall of Columbus, or the Land which was first reached by him.* By Captain A. B. BECHER, R.N., F.R.G.S.

Two islands have hitherto shared this honour—Cat Island, the claims of which were urged by Washington Irving and subsequently supported by Baron Humboldt; and Grand Turk Island, adopted by Señor Navarrete, who has also published all that remains of Columbus' original journal. It is by availing himself of this publication that Captain Becher has come to the conclusion, suggested by Señor Muñoz, that a third island, Watling Island, was really the land in question. Columbus' own words are: "It is a tolerably large island, with fine trees and a large lake in the middle of it; it has no mountains, and is covered with verdure, which is pleasing to the eye." Watling Island is eaten out by a salt-water lake, its highest part is not more than 140 feet above the sea, and it is now called the Garden of the Bahamas. Captain Becher shows that Columbus did not water his ships there, though he must clearly have been in great want of water, and therefore that this lake must have been salt water and unfit to drink. From this point he traces him step by step to the port of Nipé, in Cuba, which appears to be identified beyond question.

5. The Secretary next read a letter from Captain J. Lort Stokes, R.N., F.R.G.S., communicating the opinion of Captain Richards, R.N., on the expediency of despatching a vessel at once, in search of the relics of the 'Erebus' and 'Terror.' Captain Richards, whose experience in Arctic travelling is so well known, says :—

"I think either of three routes might be adopted, viz., one to King William Land, by Behring Strait, as proposed by Captain Collinson; another through Hudson Strait to Repulse Bay; and a third through Lancaster Sound to Peel Channel, or Prince Regent Inlet. To the last I decidedly give the preference for the following reason:—No vessel has yet reached so far as Captain Collinson's farthest in one season; and to do it in two would expend the resources and render the people unfit for searching by sledges (the only method). The plan, then, would be to select a screw vessel of convenient size, and fortify her. She would have a complement of seventy men, and be provisioned for two years. I would require no tender or second vessel. She would proceed down Peel Channel as far as possible; but should Peel Channel be impracticable (which I do not believe), then put the ship in the neighbourhood of Brentford Bay in Prince Regent Inlet. Once in a berth for winter, commence your travelling operations. Much can be done in the same autumn, but the great journeys must be taken in the following spring. Both sides of Peel Channel as high as King William Land and Gateshead Island must be explored. If the ships or their wrecks are not found there—and I think they will be—continue the search up both sides of King William Land to Montreal Island, at the embouchure of the Great Fish River. Another portion will yet remain to be examined. Between Osborn's and Wynniatt's farthest there is a space of sixty miles. This may be a strait, and may communicate with the head of Peel Channel, making an island of Prince of Wales Land. It is possible that Franklin may have passed to the south-west of Cape Walker with his vessels, and be blocked up here. The exploration of these lines of coast by sledges could, I believe, be satisfactorily done by the force I have named; and there is a conviction in my mind, amounting to certainty, that the fate of Franklin would be solved, and the remains of his ships be found."

6. The following memorial to Lord Palmerston was then read by SIR RODERICK MURCHISON, F.R.G.S.:—

"London, June, 1856.

"MY LORD,—Impressed with the belief that Her Majesty's missing ships, the 'Erebus' and 'Terror,' or their remains, are still frozen up at no great distance from the spot whence certain relics of Sir John Franklin and his crews were obtained by Dr. Rae, we whose names are undersigned, whether men of science and others who have taken a deep interest in Arctic discovery, or explorers who have been employed in the search for our lost countrymen, beg earnestly to impress upon your Lordship the desirableness of sending out an expedition to satisfy the honour of our country, and clear up a mystery which has excited the sympathy of the civilised world.

"This request is supported by many persons well versed in Arctic surveys, who, seeing that the proposed expedition is to be directed to one limited area only, are of opinion that the object is attainable and with little risk.

"We can scarcely believe that the British Government, which to its great credit has made so many efforts in various directions to discover even the route pursued by Franklin, should cease to prosecute research, now that the locality has been clearly indicated where the vessels or their remains must lie; including, as we hope, records which will throw fresh light on Arctic geography, and dispel the obscurity in which the voyage and fate of our countrymen are still involved.

"Although most persons have arrived at the conclusion that there can be no survivors of Franklin's expedition, yet there are eminent men in our own country, and in America, who hold a contrary opinion. Dr. Kane, of the United States, for example, who has distinguished himself by pushing farther to the north in the search for Franklin than any other individual, and to whom the Royal Geographical Society has recently awarded its Founder's Gold Medal, thus speaks:—

“ I am really in doubt as to the preservation of human life. I well know how glad I would have been, had my duty to others permitted me, to have taken refuge among the Esquimaux of Smith Strait and Etah Bay. Strange as it may seem to you, we regarded the coarse life of these people with eyes of envy, and did not doubt but that we could have lived in comfort upon their resources. It required all my powers, moral and physical, to prevent my men from deserting to the Walrus Settlements, and it was my final intention to have taken to Esquimaux life, had Providence not carried us through in our hazardous escape.”

“ But, passing from speculation, and confining ourselves alone to the question of finding the missing ships or their records, we would observe that no land expedition down the Back River, like that which, with great difficulty, recently reached Montreal Island, can satisfactorily accomplish the end we have in view. The frail birch-bark canoes in which Mr. Anderson conducted his search with so much ability, the dangers of the river, the sterile nature of the track near its embouchure, and the necessary failure of provisions, prevented the commencement even of such a search as can alone be satisfactorily and thoroughly accomplished by the crew of a man-of-war, to say nothing of the moral influence of a strong armed party remaining in the vicinity of the spot until the confidence of the natives be obtained.

“ Many Arctic explorers, independent of those whose names are appended, and who are now absent on service, have expressed their belief that there are several routes by which a screw vessel could so closely approach the area in question, as to clear up all doubt.

“ In respect to one of these courses, or that by Behring Strait, along the coast of North America, we know that a single sailing vessel passed to Cambridge Bay, within 150 miles of the mouth of the Back River, and returned home unscathed; its commander having expressed his conviction that the passage in question is so constantly open, that ships can navigate it without difficulty in one season. Other routes, whether by Regent Inlet, Peel Sound, or across from Repulse Bay, are preferred by officers whose experience in Arctic matters entitles them to every consideration; whilst, in reference to two of these routes, it is right to state that vast quantities of provisions have been left in their vicinity.

“ Without venturing to suggest which of these plans should be adopted, we earnestly beg your Lordship to sanction without delay such an expedition as, in the judgment of a committee of Arctic voyagers and geographers, may be considered best adapted to secure the object.

“ We would ask your Lordship to reflect upon the great difference between a clearly defined voyage to a narrow and circumscribed area, within which the missing vessels or their remains must lie, and those former necessarily tentative explorations in various directions, the frequent allusions to the difficulty of which, in regions far to the north of the voyage now contemplated, have led the majority of persons, unacquainted with geography, to suppose that such a modified and limited attempt as that which we propose involves further risk, and may call for future researches. The very nature of the former expeditions exposed them, it is true, to risk, since regions had to be traversed which were totally unknown; while the search we ask for is to be directed to a circumscribed area, the confines of which have been already reached without difficulty by one of Her Majesty's vessels.

“ Now, inasmuch as France, after repeated fruitless efforts to ascertain the fate of *La Pérouse*, no sooner heard of the discovery of some relics of that eminent navigator than she sent out a searching expedition to collect every fragment pertaining to his vessels, so we trust that those Arctic researches which have reflected much honour upon our country, may not be abandoned at the very moment, when an explanation of the wanderings and fate of our last navigators, seems to be within our grasp.

"In conclusion, we further earnestly pray that it may not be left to the efforts of individuals of another and kindred nation already so distinguished in this cause, nor yet to the noble-minded widow of our lamented friend, to make an endeavour which can be so much more effectively carried out by the British Government.

"We have the honour to be, my Lord,

"Your Lordship's obedient Servants,

" F. BEAUFORT,	W. HENRY FITTON,
ROD. I. MURCHISON,	LYON PLAYFAIR,
WROTTESELEY,	THOMAS THORP,
EGERTON ELLESMERE,	CHARLES WHEATSTONE,
F. W. BEECHY,	WM. JACKSON HOOKER,
RICHARD COLLINSON,	JOS. D. HOOKER,
CHARLES G. B. DAUBENEY,	JOHN ARROWSMITH,
W. WHEWELL,	PETER LA TROBE,
W. H. SYKES,	W. A. B. HAMILTON,
JOHN FERGUS,	ROBERT STEPHENSON,
P. E. DE STRZELECKI,	J. E. PORTLOCK,
W. H. SMYTH,	C. PIAZZI SMYTH,
ASHHURST MAJENDIE,	C. W. PASLEY,
ROBT. FITZROY,	GEORGE RENNIE,
E. GARDINER FISHBOURNE,	J. P. GASSIOT,
ROBERT BROWN,	C. B. AIRY,
GEO. MACARTNEY,	J. F. BURGOYNE.
LEONARD HORNER,	

"*The Right Hon. Viscount Palmerston, M.P., G.C.B.*"

In addition to the above mentioned, many officers of the Royal Navy who have been employed in the search after Franklin, and who are now absent from London, have previously expressed themselves to be favourable to the final expedition recommended.

7. It was next announced that Mr. A. W. Wallace, F.R.G.S., had returned to Singapore from his expedition to Borneo, and was preparing to visit Celebes, where he hoped to explore portions of that island hitherto unknown, as well as islands of the Molucca group. At the request of the Council, Mr. Wallace has been furnished, through the kindness of Lord Clarendon, with letters of introduction from the Governments of Holland and of Spain, to the authorities of their different colonies in the East.

8. The Chairman then adjourned the Meeting to the 10th of November.

ADDITIONAL NOTICES.

1. *The Cape Palmas Settlement of Liberated Negroes.* By PHILIP SCHÖNLEIN.

Communicated by Dr. HODGKIN, F.R.G.S.

Cape Palmas, 28th September, 1855.

THE apparent object of the Colonization Society, in re-transporting the coloured people to the land of their fathers, has been, I think, to make them cultivate the soil, and thereby not only to improve their own condition, but to set the natives an example of the blessings of agriculture. This, however, has been attained in a very limited degree, the chief obstacle being the facility for making money on a small scale afforded by the trade with the natives. It seems that this evil has been fully foreseen by the Society, for I found in its 'Collection of Ordinances' a clause which forbids trade with the natives, except in articles of food, to all but those who had taken out a licence. I think, however, the exact line of distinction between articles of food and those adapted for commerce is difficult to mark out, especially in Africa, where the very same fruit, the palm-nut, furnishes the chief commercial commodity, and, at the same time, an important national dish—the so-called palm-butter. However that may be, ever since the declaration of independence that law has been entirely disregarded. At present, by far the greater part of the settlers confine themselves to the cultivation of fruits and vegetables, little exceeding in quantity their own wants; for the rest of their earnings they depend on the trade with the natives, either by carrying it on on a small scale for their own account, or by working on board one of the small coasting vessels belonging to the wealthier members of the community. In general, the poorer classes of the people here, prefer working for wages to working on their own farms. One of them said very significantly, when he spent a day in planting potatoes in his own garden, he got the worth of his day's labour only in three months, by selling the potatoes; but when he worked in another man's employ, he got his pay at the end of the week. A great number of the colonists, especially mechanics, are constantly employed at Government works, or at buildings erected at the expense and for the purpose of the different missionary societies. The best proof that I could allege for the truth of what I have mentioned is the fact, that notwithstanding a peaceable existence of twenty-one years, the colony does not produce a single penny's-worth of the merchandise exported, it being entirely derived from the trade with the natives. And yet the soil throughout the colony is eminently fertile: all African and West Indian fruits and vegetables grow luxuriantly, but they are raised *on so small a scale* that foreign vessels trading on this coast seldom, if ever, take in fresh provisions at Cape Palmas, on account of their being too dear. Indigo is growing wild on the Cape, covering acres of ground; the senna shrub and the castor-oil plant may be seen everywhere. But it has been found out that the soil is particularly well fitted for the cultivation of coffee. The bean is said to be of a better flavour than that grown in the Brazils; besides that, the tree grows faster and yields a more abundant crop than in the latter country. Notwithstanding this important discovery, coffee is but little cultivated, and those who grow it at all, have, for the greater part, but a few trees in their gardens, producing one or two dozen pounds a year. Here, however, I am glad to have to state an honourable exception, which shows what *can* be done in a comparatively short time.

Mr. Smith arrived here from America in the fall of 1850, and now, after only two years, he has nine acres carefully planted with coffee trees, which, in two years more, promise to yield an abundant crop. This man, working hard all the time from his first arrival, has suffered less from the fever than many idlers, who make the latter disease an excuse for their avoiding exercise. Sugar might also be raised advantageously in the colony; but it is true that this would require machinery, and consequently an outlay of capital beyond the reach of most of the settlers. A coloured gentleman, one of the chief palm-oil traders of this place, seemed to think, however, that the want of machinery was but a minor obstacle; "for," said he, "what our people want more than sugar mills, and what it would be more difficult to give them, is energy and perseverance to plant, keep the plantations clean, and cut the cane."

The astonishing discrepancy which manifests itself in the progress of this colony and that of its more northerly sister, Monrovia, can only be accounted for by taking into consideration the difference of the sources from which the populations of both are derived. Monrovia, Marshall, and Bassa Cove have been settled by the American Colonization Society; Sinou, by those of Pennsylvania and Mississippi. In these places, therefore, a large part of the inhabitants consists of highly-educated persons from the free states, where the coloured people are not in the same measure deprived of schools and facilities for acquiring useful knowledge, as in the southern or slave states. The settlement at Cape Palmas having been formed by the Maryland Colonization Society, with a view to be chiefly peopled by the coloured inhabitants of the state of Maryland, the bulk of the colonists consists of former slaves who have been manumitted only a short time previous to their emigration from America. The few educated men who have come to this colony are mainly engaged either in the coasting trade or in the management of Government business; and I think it reflects the highest credit on the leading men of this community, that during the twenty-one years from the first settlement down to the present day, not a single shot, nor even angry word, has been exchanged with the surrounding native tribes. This lucky result is doubtless owing, in part, to the restraint put on the traffic in rum. On the whole, I think, brighter days may confidently be looked for. Several missionary societies have established schools in the colony, and are doing their best to enlighten the minds and understandings of the growing generation. There are now four places of worship in the colony: two belonging to the Episcopal Church, one Baptist, and one Methodist chapel. Another church, belonging to the latter congregation, is in course of erection. Of these three different churches the two latter confine themselves to service in the colony; the Episcopal is the only one attending to the conversion of the natives. There are two more stations of this church near Cape Palmas—one at Rocktown, and one at Cavally. The latter is a bishopric.

The total number of inhabitants, exclusive of natives, is at present little more than 1000; the annual immigration amounts to about 60. The farming establishment of the colonists extends 3 miles into the interior in an E.N.E. direction. Last year, the colony declared itself independent, and elected its own governor, who is, however, as formerly, paid by the Colonization Society. Of late, the question of annexation to the Northern Republic has been discussed, but the Liberian government insists upon this colony being annexed as a county, while the public opinion here is in favour of forming a federal state like the American union. As a reason for refusing to join Liberia as a county, it is asserted that the centralized form of government, introduced into the latter by the new constitution, might injure the interests of the Cape Palmas colony.

As to commerce, the exports consist in palm-oil, camwood, and occasionally a little rice (which might be procured in any quantity, being extensively

grown by the natives). From October, 1854, to April, 1855, the exports were as follows, according to official returns:—Palm-oil, 35,803½ gallons; camwood, 19¼ tons; rice, 1177 croos (1 croo = ½ bushel); cash, 7725 dollars. The imports consist chiefly in salt provisions, flour, fancy articles, and the various commodities in demand by the natives. The entire value of imports during the above period has been 29,963 dollars 39 cents; yielding a customs revenue of 2242 dollars 33 cents.

NOTE.—The foregoing communication was written by Ph. Schönlein but a short time before his death, which was announced in a former number of the Proceedings. The late President of Liberia, J. J. Roberts, has since arrived in this country, and brings the information that the death of this excellent young man was occasioned not by the ordinary fever of the country, but by exposure to the sun whilst engaged in botanical researches. Baron Humboldt, in a letter addressed to Dr. Hodgkin, speaks of him as feeling towards him the affection of a near relation, and asked aid in obtaining information regarding him as the greatest favour which could be rendered to the oldest traveller on the banks of the Oronoco and over the Steppes of Siberia.

2. *The Chinese and their Rebellions, &c.* By T. T. MEADOWS, Esq., Chinese Interpreter to Her Majesty's Government in China. 8vo.

In this analysis the Preface and the chapter—rather a long one—on Civilization, we leave to the consideration of readers who are fond of theorising.

The first chapter furnishes a geographical account of China, showing the important distinction between CHINA PROPER and the far more extensive and comparatively independent countries included under the Empire; giving also an explanation of the military and civil government.

Ch. ii.—The Emperor is absolute, as being the *Ten-tze*, the Son of Heaven, or chosen servant of the Most High; certainly not so *by birth*. The idea of hereditary monarchy existing in China is a fallacy, and when disasters of war, pestilence, and famine, or other unusual evils occur, the Divine commission may be withdrawn, unless the monarch repent him of his evil ways and promptly “return to conformity with Heaven’s laws.” In fact, “the pure theory of succession is, that the best and wisest man in the empire should be nominated,” and the principle of primogeniture seems to be wholly disallowed. “The worthy and talented,” the “good and able,” were the persons to be chosen for all appointments, high or low. The author insists on the system of examinations for degrees in political science, ethics, history, and law, which, being indispensable in China, he recommends to the notice of the British Government. The Chinese, though autocratically governed, *have always maintained the right of rebellion*, as the only mode of stopping vicious legislation and administration (Ch. iii.). The Mongol, and after them the Manchoo dynasties, have for many centuries oppressed the Chinese and governed the country on principles diametrically opposite to those established by the fundamental principles of the empire. Under their misrule “the sale of government posts was most extensively carried on; and corruption, tyranny, disaffection, robbery, piracy, local insurrections—misgovernment, in short—prevailed up to 1850, when the ‘Kwang-se rebellion’ broke out” (p. 33); which may haply result in the entire emancipation of China from the tyranny of the Manchoo, and the establishment either of Christianity, or the old and long-cherished Con-foot-see faith, under the dominion of a native Chinese sovereign.*

* Huc’s work is criticised in Ch. v.

The rebellion was decidedly religious, and there is ground for believing that it derived its origin from Christianity. The originator of the movement was one HUNG-SEW-TSEUEN, a poor peasant of the Hwa district, about 30 miles from Canton, who exhibited such early talent, that his parents gave him an education which enabled him to compete for the degrees at Canton, though without success, owing probably to the greater interest of more wealthy candidates; for every post, degree, or rank, high or low, of late years, went by money in China. The young Luther of China, however, destined to be its Napoleon, was not to be daunted. He met with *Protestant* missionaries, heard certain startling, consolatory truths, and obtained books that wholly altered his character, and prepared him for his grand mission, and appointment by God "to restore the world—that is, China—to the worship of the true God." (p. 81.) His first converts were humble like himself, village schoolmasters; the most important of whom, for future events, was FUNG-YUN-SAN. These two travelled about the mountain provinces, propagating the new faith, and eventually formed congregations, known as the "Society of God-worshippers," which became the strength of the religious-political rebellion that now shakes the imperial throne. (p. 85.)

From 1840 to 1847 this sect remained in comparative obscurity, gradually acquiring Christian knowledge under missionaries from Canton; nor was it till 1850 that the God-worshippers were brought into collision with the local authorities, and forced to a movement of a purely political character. (p. 105.)

Rebellions, however, were no new thing in China. The dynasty of the Mings was overthrown in the seventeenth century not by the Manchoo Tartars, but by a native rebel, one Le-tze-ching. Forty years later, Woo-san-kwei and three other native princes threw off their allegiance from the Manchooks, and were only subdued, after a war of seven years, by the Manchoo Emperor Kang-he. From 1683, also, to the present day, South-eastern China has been the great seat of a formidable political society, best known as the San-ho-whuy, or Triad Society, the express object of which has been the expulsion of the barbarian conquerors of their country. Passive, peaceable opposition to the tyranny of the mandarins, by the way of strikes among the productive and distributive classes, has been of frequent occurrence; and occasionally companies of bandits or rebels openly defied the authorities, pillaged the local custom-houses and treasuries, levying blackmail on the wealthier inhabitants. These, in fact, have become more common in recent years, owing to the growing corruptions and increasing financial difficulties of the state; and in 1849 Mr. Meadows confidently foretold the downward career and fall of the Manchoo dynasty. (p. 122.)

The formal rising of the God-worshippers occurred in Oct. 1850, with the view of finally expelling the Manchooks and establishing the new and native dynasty of *Tae-ping*, or Universal Peace. These religious insurrectionists inspired an alarm far greater than any caused by the Triad Society; and in July, 1851, an imperial army was organised under Shae-hang-ha to oppose the rebel troops, who were gradually advancing northward, joined by two female rebel chiefs, at the head of 4000 followers, and eight chiefs belonging to the Triad Society, who were allowed to join only on condition that they would conform to the worship of the true God. (p. 151.) In the autumn of 1851, the Tae-pings left the Seang district and established themselves in Yung-gan, the capital of which they occupied; then forming an army of 16,000 against 30,000 of the Imperialists, the latter, however, being anything but efficient troops. It was about this time, too, that Hung-sew-tseuen assumed the title of "Heavenly," or "Divine Prince." In the following March the Tae-pings appeared before Nanking, and though a force of 20,000 Manchooks was there to defend that imperial city, they did not strike a blow, and both soldiers and people were indiscriminately massacred. (p. 170.)

Three other large and important cities, also, on the Yang-tse river, were taken and occupied without resistance ; and the rebel army now amounted to about 70,000 men.

From the taking of Nanking commences a new era in the history of the Tae-ping rebels ; for henceforth, instead of moving from place to place in one united body, they permanently occupy an extensive position in the heart of the country, and send out separate armies in different directions. In May, 1853, a detached army landed on the north side of the Great River, defeated two bodies of Tartars, and took Fung-yang, whence they advanced to Kae-fung, the capital of Honan ; but here, as well as at Hwae-king, they were unsuccessful. In the course of the autumn, however, they captured upwards of twenty cities, and advanced so far towards Peking, as greatly to alarm the court and capital. Loo-chow was taken Jan. 14, 1854 ; Luh-gan, Feb. 17 ; and Ling-sing, April 1 ; thus taking city after city as they progressed northwards. Another army, meanwhile, was despatched up the Great River to Nan-chang, the capital of Keang-se, to which they laid siege in June, 1853, but without success, though detached forces took two other cities to the westward, and pillaged several others. Yo-chow, Chang-ti, and Tao-yuen were taken during the summer ; and Woo-chang, the capital of Hoo-pih, surrendered after a siege of 80 days. They shortly after withdrew, but returned in greater force the ensuing year, when they took Han-kow, and again took Woo-chang by storm. Such is a brief sketch of the successes effected by the Tae-pings till the spring of 1855 ; and now the valley of the Great River has again become the exclusive scene of war, on a much more extensive scale than when they first fought their way through it to Nanking ; in fact, hundreds of thousands of men, both in the far-east and the near-east, are engaged in deadly strife for the highest earthly prizes. (p. 189.)

In Chapters xv., xvi., and xvii., are detailed and interesting accounts of the intercourse of the Tae-pings with the Western foreigners, including Mr. Meadows's diary of an excursion on the Grand Canal in quest of information respecting the rebels ; the result of the whole being, that while the author condemns all foreign intervention whatever, either for or against the Tae-pings, he considers their establishment in China will contribute essentially to the peaceable extension of free intercourse and commercial privileges ; whereas from the present dynasty they can only be obtained by disastrous wars, calculated to engender long national hatred, and to destroy that very industry which alone makes commercial intercourse valuable. (p. 325.)

Chapter xviii. contains a very elaborate account of "the philosophy, morality, and polity of the Chinese, as well as of the religion of the governing class." There are three great prevailing systems of philosophy in China—Taouism, Buddhism, and Confucianism ; but the last, more ancient by centuries than either of the others, has always succeeded in maintaining the chief ascendancy, and is now deemed the orthodox creed throughout the country. Confucius, or Kung-tsze, however (who was born B.C. 551), was by no means the originator of Chinese learning, for both metaphysical and ethical doctrines can be traced more than 2000 years prior to the Christian era, Fuh-he being considered the founder of Chinese civilization generally. Confucius, indeed, was rather a commentator and expounder of more ancient systems than the founder of a new one ; but by him and Mencius, or Mäng-tse (B.C. 317), the whole was amalgamated. After this period the study of philosophy seems to have been almost dormant, till the invention of printing in China (A.D. 932), by causing a circulation of the sacred works, led to a revival of literature and philosophy. Hence we date a second philosophic epoch, commencing with Chow-tze, A.D. 1034, and closing with Choo-tze, who died A.D. 1200 ; the last of whom is "the fashioner of the Chinese mental life as it now exists, and, in virtue of the vast practical effect of his labours, may fairly claim to be considered one of

the greatest men made known to us by history." (p. 335.) His works were historical as well as philosophical; and to this day his views of philosophy, morals, and politics have reigned supreme in China, his works being learned by heart by millions of Chinese, and deemed indispensable at the Public-service Examinations. With the exception, indeed, of the "Complete Philosophy," published, A.D. 1368, by command of the first Ming emperor, and an abridgment of it, entitled the "Essence of Philosophy," in the reign of Kang-he, the second Manchoo sovereign, Choo-tze's are the only works in which the national philosophy is studied. To give the author's exposition of Chinese philosophy, which extends over nearly seventy pages, is obviously quite beside our purpose; but they are well deserving of an attentive perusal by the ethical student.

Mr. Meadows next considers the religious and moral tenets of the Tae-pings, as expounded in their own publications, either founded on the translations of the Bible, as those by Hung-sew-tseuen and his more devout followers, or dwelling on the new alleged revelations from God or Christ, written more recently with a view of furthering the political and military objects of the Tae-pings, by working on men's religious feelings—a class of writings always viewed with dissatisfaction by Hung-sew-tseuen himself. From the former of these it appears that "the Christianity of Hung-sew-tseuen and the more educated of the God-worshippers, is the product of an unassisted study of more or less inaccurate translations of the Bible, by men who had, up to the age of full manhood, devoted themselves to the study of the Chinese Sacred books, and who more or less firmly believed that the fundamental views therein contained, truly pictured the origin and nature of the universe, and constituted the bases of the only true psychology and morality" (p. 413). It is, indeed, an anthropomorphic theism, a belief in God the Father existing at times under a human form, with human attributes, but yet the Almighty, All-wise Creator and sustainer of the universe. All men, they hold, are brothers sprung from a single ancestor produced by or proceeding from the breath of Shang-te or God; and hence is derived the notion that "righteousness is man's inborn original nature." As for the origin of evil, it is ascribed to Yen-lo-wang or "the serpent-devil, the Pluto or king of Hades of popular superstition, and the Tae-pings all bear intense hatred to him and his attendant demons." On the person of Christ their books state, that "the Saviour, the Lord Jesus, is the eldest son of the August, Supreme God," but is only styled Lord, not God; so that they do not hold him as either co-equal or co-eternal with the Father, and hence, of course, the Trinity forms no part of their creed. For further details on the theological tenets of the Tae-pings, the reader must consult the work itself, as well as on the fanatical ideas engrafted on the original creed—ideas which are more akin to Mormonism or Mysticism than pure Christianity; and we now proceed to explain the author's views respecting the prospects of the Tae-pings. "At present," says he, "they have the bulk of the learned against them; but progressive successes will cause the learned to go over to them in increasing numbers, and adopt the new belief; and the end will be that the struggle will commence between the Confucian or rational, and the Buddhistic or fanatical elements of the Tae-ping Christianity; followed by the triumph of the former and the definitive establishment of a sect that will discredit all new revelations, and make the Bible alone the standard of its religious belief." Meanwhile, the political struggle is still doubtful; the Manchoo nation is still powerful, and, by the aid of the Mongols, may perhaps eventually put down the Tae-ping rebels, though neither of the contending parties can even themselves feel assured of success, whatever their language and hopes may be. (p. 463.)

Lastly,—the question is canvassed, what is the best policy of the Western nations towards China, especially with respect to interference in their intestine warfare. "No nation," the author holds, "has the right to aid, by actual

force or by intimidation, one of the contending parties in any other nation, unless it be to counterbalance the aid given to an opposite party by a third nation." Now the four most powerful nations in the world are interested in China. England and America have large and increasing commercial interests and missionary enterprises engaged there; France has the same to a less but still increasing extent; and Russia has not only important commercial interests at stake, but has a common boundary with China for thousands of miles, a boundary on which she has shown a determination to encroach. In fact, were Russia allowed to conquer China, she might become the mistress of the world and pursue her conquests into America. That Russia has before made aggressions on the Celestial Empire is matter of history; and as China is herself unable to resist her for the next generation, it becomes the duty of England, France, and America vigilantly to watch the movements of the Muscovite, and enter into a compact to preserve the Chinese Empire from such aggressions, without at the same time interfering in any way with the quarrel between the Manchocs and Tae-pings. The work concludes with some observations on the *morale* of the opium trade, which the author defends, as not more objectionable than many other branches of our commerce with the East.

3. *Notes on the late Arctic Expeditions.* By Captain SHERARD OSBORN, R.N., F.R.G.S.

Communicated by the SECRETARY.

It is some years since, on a similar occasion, I was called upon to give my experience of the past, and hopes of the future, to this scientific body. Some of those now present may remember that occasion. I then combated the idea that Franklin's squadron had perished east of Beechey Island, and retreating home from their first winter quarters, and your generous sympathies went with me in my views—that those gallant men were incapable of turning their backs in 1846 upon work they went to execute in 1845. The sequel has shown that we were right, though there were those who looked upon the sanguine as visionaries; and Dr. Rae's evidence proves that some of Franklin's crew only perished in 1850.

Where I was wrong was in heeding that great Arctic bugbear, "the want of traces." It was the absence of these traces for a distance of 100 miles down either side of Peel Channel, searched by Sir James Ross and Lieut. Brown, which made me and others look hopefully to the route that held out the next best hope—*Wellington Channel*.

It is easy now to turn round and condemn those who advocated the search in 1852 up that route. I would remind them that, but for the hopes which lay in that direction, the search would have been abandoned in 1851; and, at any rate, all England can say we never desisted from the search until a clue was discovered. What a source for congratulation it must be to every right-feeling person that we did not, as many suggested years ago, cease our exertions to find them! and is there not something more than remarkable, that, just as a noble squadron has been deserted, and the search likewise, that God should grant a clue to Dr. Rae, which shows us that within an easy sledge journey of the position of either of our ships, the ill-fated 'Erebus' and 'Terror' are probably lying? With respect to our past operations and discoveries of 1852–53 in Wellington and Queen Channel, I would recall to your notice the state of the chart when we left England, to give you an idea of what has been done, and *that* mainly by the zeal and strength of seamen dragging heavy sledges over the rough and frozen surface of the Polar Sea. It has not been, believe me, by sitting in a boat or sailing in a ship that all those many miles

—more than 2000 geographical—have been added to that chart. It has been alone by dint of sheer strength and perseverance, and long endurance of great miseries, that such work has been accomplished. Many of the poor men will carry to an early grave broken-down health, engendered by exposure and excessive hardship; many of them sunk under it; and I can safely aver that the devotion of our soldiers and sailors before the walls of Sebastopol does not excel that of those poor fellows in their past exertions to rescue Franklin's crews.

You will recollect that, in 1852, the 'Assistance,' 'Resolute,' 'Intrepid,' 'Pioneer,' and 'North Star,' left England to resume the search. I will not detain you with any remarks upon our route to Beechey Island. It is only to novices that that voyage is attended with much that is dangerous and striking. But there is one point upon which I would endeavour to undeceive you. I dare say you all, as well as myself, have heard of coal existing upon the island of Disco as a late discovery. I know it cost us a wild-goose cruise up the Waigat, and the loss of some days' important time. Now, as far back as 1806, Professor Gieseke, a Dane, I presume, discovered this fact; and in an old number of the 'Edinburgh Encyclopædia,' which you will see in a more condensed form under the head 'Greenland,' of a Gazetteer lately published by Messrs. Fullarton, you will get much interesting information of those long-known coal beds, and the geology of that part of the Arctic regions. On the west side of Davis Strait coal is very plentiful, especially about Cumberland Strait, Cape Walsingham, and Home Bay; and, indeed, from thence it extends to the N.W., in a greater or less degree, as far as Banks Land.

On the 13th August, 1852, all our squadron was assembled at Beechey Island. Parties went to research the scene of Franklin's winter quarters; but, as you may fancy, after a couple of hundred seamen had, in 1850, turned everything topsy-turvy, and carried and dropped things far from where they were originally deposited, those who first visited the place in 1852 can have but little idea of what the place was like when we found it as it had been left by the 'Erebus' and 'Terror.' Having completed with more than three years of everything, which would carry us on to 1855, the 'Assistance,' in tow of the 'Pioneer,' started for Wellington Channel. The 'Resolute,' with the 'Intrepid,' had the work of going to Melville Sound, up Barrow Strait. The 'North Star' was our dépôt to retreat upon. On the night of August 14th, we, the Wellington Channel division, started. The night was beautifully calm and clear, not a piece of ice to be seen; and you can better fancy than I can describe the excitement of penetrating a hitherto unvisited sea, and seeing unroll before one fresh lands and waters, untrodden and unvisited by man. Next day we commenced to sail instead of steam, and what with landing upon points for observations and angles, our progress was but slow.

As far as Cape Becher, you will remember, parties from the 'Lady Franklin,' in 1851, had repeatedly gone over the land, and particulars of it have been fully and ably detailed by Dr. Sutherland, in his work. The only remark I have to make is, that although right in latitude, we found Penny too far to the westward at Cape Becher—a pardonable error when he had no chronometers supplied, and was not surveyor enough to triangulate his work.

It was not until midnight of the 16th August that we fairly entered Queen Channel. Hitherto we had seen no ice; and as yet a clear sea rolled before us. We could only see about thirty miles more land, which, of course, shortened up considerably the length of that channel. Its direction appeared to be N.N.W. true, and the tide of about three knots force, in the narrow. *Albert Land*, as the N.W. extent of North Devon has been styled, becomes more wild and striking west of Cape Becher, and abounds in magnificent harbours.

The opposite shore, or Bathurst Land, is less picturesque, but contains more animals, and possesses a finer vegetation. The former I may describe as of

the most barren character, and, for the most part, magnesian limestone; the latter, in places, has a good deal of soil, overlying sandstone and fossiliferous limestone. On the 17th, noon, or rather before it, another landing for angles, observations, and cairn-building took place at Cape Franklin, on the north shore, and, from its summit, I was not a little disappointed to see that the breeze, before which we had been sailing, was blowing upon a tight pack edge, extending right across the channel from shore to shore. Away to the N.W. was one vast body of ice, broken and detached, but without a pool of water amongst it. That night we went into a harbour close to Cape Franklin, and the rest of our sailing adventures in those seas is soon told. At midnight the wind chopped suddenly round to the N.W., and in one hour the winter was upon us. To give you an idea of its suddenness, I had a party on shore, watering the ship by means of a canvas hose, led down a rivulet; the stream froze from the hill top to the sea in the middle watch, and the hose was brought off one solid column of ice as thick as my arm. On the 18th the land was white with snow—the soil was everywhere frozen. The sea, yesterday all blue and sparkling, was covered with one great body of ice, rolling along to the S.E. and down Queen Channel; and prepared as I had been, by experience, for the sudden advent of winter, I had no idea of a change so early, or rapid. Until the 5th October, Sir Edward Belcher, Richards, and myself, continued hard at work, sledging and boating over the surface of a half-cemented sea. The main object I had in view was to see our road for the following spring journeys. In a trip to Table Island and the Wall Cliff, on which occasion Sir Edward Belcher made a flying visit to an extensive land to the north, called North Cornwall, situated in the parallel of 77°30' north, I became fully satisfied that I had been right in the chart published by me in 1852, in leaving Jones Sound open to the west; and when I saw the flood-tide coming from it, and the ice all driving towards it, it required no great brains to see that we were on a sea opening into Baffin Strait.

Sir Edward Belcher's journey in 1853, some fifty miles farther, or beyond the place reached by Captain Richards and myself in 1852, only goes to confirm that hypothesis. The *actual connection* of Jones Sound with the water north of Queen Channel, resting only as yet upon opinion, there is still fifty miles of unknown region intervening.

The winter of 1852-53 was a fearfully severe one. In Banks Land, Melville Sound, as well as with us, temperatures were recorded below 60° of Fah., or 90° below freezing point; and what with us added to its rigour, was the unusual prevalence of cold, piercing mists, occasioned by the rapid tides destroying the ice in our neighbourhood, and the condensation of the warm vapour thrown off from the water. This, together with the total absence of the sun for 106 days, or three months and a half, made it, I should say, one of the most, if not the most, trying winter ever undergone. I shall not detain you farther with these particulars, and proceed to describe the spring operations of 1853.

Captain Richards and I, with a strong division of sledges, were to go westward, whither, of course, it was natural to be supposed Franklin would have gone. So little of the coast was seen beyond Cape Lady Franklin, that no one could tell where it might lead us before we reached Byam Martin Channel, of which, as a communication into the Northern Sea, I had no doubt.

Sir Edward Belcher was, with the ample means which would be at his disposal by the return of some of our sledges, and three of his own particular division, with some picked men, to explore the lands to the N. and N.E. of the ships, reaching Smith Sound, as well as the cairn left by the 'Pioncer' in Jones Sound in 1851, which was about 150 miles from our winter quarters. We, the western division, started to establish a large depôt upon Cape Lady Franklin, on the 22nd of March, 1853—nearly twenty days earlier than

travelling had before been attempted. The skill and kind consideration of our gallant leader Captain Richards preserved us, by the aid of a good Providence, from any serious accidents at that inclement season of the year. We returned again, having accomplished that duty most successfully, and were not again allowed to leave until the 10th of April, 1853.

We found the coast-line very tortuous and indented, the weather thick and boisterous, and it was the end of April before we reached Byam Martin Channel. One glimpse of some distant hills, over a frozen sea of ice, showed at once that we were at the head of a strait, in about 107° W., up which Lieutenant Aldrich and Dr. Bradford had travelled in 1837. Now reduced to three sledges we struck across, W.S.W., for the opposite shore.

Several days' dense fogs and strong gales gave us the idea of being altogether adrift; and having erroneously struck off for what sailors call a cape-fly-away, when we joyfully struck the land, Capt. Richards and I now trudged on, the coast trending very precisely alternately N. and S., until on the 17th May the state of our commissariat rendered it necessary to leave him to proceed alone for the remaining 42 days for which he was victualled. We were now, you will observe, 37 days out from our ship, or a distance of about 300 miles, Captain Richards's retreat, as well as his advance, having been secured by the assisting sledges; and he could add to that 300 miles a farther distance of 200, making a total of 500 miles out, or 1000 in all. I was trudging back, when Lieutenant Hamilton, of the 'Resolute,' who came up, *viâ* Hecla and Fury Gulf, overtook me, and from him I learned that the 'Resolute' and 'Intrepid' had, after most strenuous exertions and no small risk, reached Melville Island in 1852. They wintered in Bridport Inlet, ascertained Captain M'Clure's position, and his discovery of the North-West Passage; and, just before he left, the communication with the 'Investigator' had been established, and they might be considered rescued, although M'Clure was still determined and hopeful of accomplishing the whole journey in his own vessel. On the 7th of April the searching parties of the 'Resolute' and 'Intrepid' had started, under Commander M'Clintock and Lieutenant Mechem, to explore W. and N.W., and the route they had taken, in consequence of a pre-arrangement with our division before leaving Beechey Island, entirely clashed with our western work. Rather than come back empty-handed, Captain Richards went on to the 'Resolute,' though, as you may suppose, keeping up an Arctic postal arrangement was hardly worth all the labour and expense of such an expedition as ours had been. I returned to Cape Lady Franklin, sent an officer to Sir E. Belcher, with all the news I had obtained possession of, and then went on working down the west side of Queen Channel.

When I left the ship, this latter part of our work was not contemplated; but Captain Richards and I, on thinking it over, thought it best to provide for the search of so important a strip of coast-line. The ice began to break up just as I reached Cape Lady Franklin—indeed in Queen Channel large patches of water had been seen as early as May 12th. A heavy mahogany gig was, however, available; and, rather than leave the work unfinished, I determined with five men to risk a cruise over the pack. Scurvy had weakened my crew of two. Without tents, or indeed anything but what we stood up in, we started on June 25th from our Cache, and continued leading an amphibious life, alternately upon ice and water, until July 6th, when lack of provisions and the lateness of the season obliged me to turn back. I was then going to the eastward of Dr. Goodsir's position, but not having any chart except my track one with me, did not know how close I was to the limits of MacDougall Bay. Otherwise I might have set another geographical question at rest—although it is my belief that the range of vision down that channel carried me right through and into it.

I came back to find that Captain Richards had arrived at the Cache in safety, and been recalled as well as myself, as the ships were going to Beechey

Island immediately. After a day's chase I caught them, having had the honour at any rate of being the last to leave the search to the N.W. Captain Richards's journey back from Bridport Inlet had been a marvellous one—his average daily journeys had been 15 miles in straight lines, and at a season of the year when the labour of wading through snow water and sludge was excessive. In crossing the head of Byam Martin Channel, his position must have been most trying. The Strait is nearly 36 miles wide at that point, and that covered with melted snow, varying from 1 to 3 feet in depth, a ripple over its surface giving it quite the appearance of open sea, whilst the hummocks, which stood up through it, might be taken for loose driving pack.

It required some confidence and nerve to push on under such circumstances; but foreseeing this, or even an early disruption of the ice, we had taken a boat all the way to Melville Sound; it only weighed 300 lbs. complete, and gave some assurance of safety in case of need.

The chart shows the result of the united labours of our division of sledges.

With respect to what took place to the N.E., I am as ignorant now as the public generally must be. A ravine was found, giving promise to a future traveller of being able to reach the Northern Sea easily out of Alfred Bay in Wellington Channel. Such ravines are common throughout those Arctic lands. Water was seen as early as the 28th May, extending to the N.E. This Sir Edward Belcher, I fancy, believes to be Jones Sound or Strait—it very *probably* is so. Bringing back his boat and a large quantity of provisions, all the N.E. division returned after a 52 days' journey.

North Cornwall had not been revisited by his parties, and I therefore feel myself at liberty to carry its western coast into 100° long., where, from the *Sisters*, I distinctly saw some land bearing N. (true). Of its eastern shore all I could glean was from Dr. Lyall, who went with Sir Edward Belcher to his extreme N., an island then called after the Duke of Buckingham. He confirmed what I had imagined from my view of it in 1852, that it extended away to the N.E. far beyond our ken.

I have now brought up our labours to the commencement of a retrograde movement; and although after that we had many long months of suffering and hard work, it was, I may say, more in connexion with preserving the centralisation of our squadron and certain postal arrangements, than that of the search for Franklin's squadron.

Whilst we completed the work from Queen Channel to Hecla and Fury Gulf, Captain Kellett's crews were working admirably to the W. and N.W. of the last meridian. Commander McClintock and Lieutenant Meham each made enormous journeys of about 1100 or 1200 miles. They explored the shores of two islands, Eglinton and Prince Patrick, the terminal ones of the Parry group, and thus set at rest any questions as to the 'Erebus' or 'Terror' being anywhere upon those shores; whilst upon the western coast, ice of such extraordinary thickness was found as to hold out no prospect of a navigable sea in those latitudes.

In 1852 Captain Kellett's squadron, then falling back with the crew of the 'Investigator' as passengers, was caught by the winter, and spent a season in the pack, driving with it about 80 miles nearer home before it became permanently fixed. In 1853 Captain Kellett, keeping in view the service he went to execute, sent off his available officers and men to leave information for Captain Collinson of Captain McClure's safety. That summer, after one of the most rapid sledge journeys upon record, we learned from Lieutenant Meham the intelligence of Captain Collinson's having, a year after McClure, visited Prince of Wales Land, and that he had gone on to the eastward by Dolphin and Union Strait.

Of the rest of our achievements I refrain from speaking, and beg now to touch upon the results of our labours, as affecting that science to which this Society is devoted.

It will be seen that we, in the first place, have materially altered and rendered more conformable to geographical delineation the outline of Wellington and Queen Channel.

That the coast-line of the Parry group has been by sledges and travellers entirely completed, except in two small spots of 10 miles, viz., between Lieutenant Meham and Commander M'Clintock's farthest, and Commander Osborn's and Mr. MacDougall's, though both are sufficiently close to leave no room for doubt as to the actual configuration of the land. North Cornwall, as well as many islands, have been added to the chart. The former may be a very extensive continent, and I believe is serving to hold up and to prevent drifting into Queen Channel, or the adjacent waters, that tremendous ice which Captain M'Clure so graphically describes, and so nobly battled with.

The theory of a Polynia has received but little confirmatory testimony from our experience. The water seen by Penny, and by ourselves, was made by the action of strong tides in a narrow channel: wherever the channel expanded, and the tide was consequently weaker, the ice became firm. Our winter in Northumberland Sound was most bitter; and although there were indications of water near us until a late season, that water was evidently occasioned by tides, and not from the sea being of an uncongealable depth.

The animals and birds did not appear to me to consider there was any better region existing to the N. of our position, and in the autumn were as usual seen passing to the S.

As to navigating a Polynia during the winter, as proposed by some visionary or other, I am sure any one who has witnessed the action of frost during an Arctic winter will agree with me that it would be impossible. Such a sea, if one existed, would be covered with one dense mass of vapour like a smoking caldron. In it the mariner would see neither dangers to be avoided, nor heavenly bodies whereby to guide himself. Although the sea might be liquid, yet the air would be so cold that men could not expose themselves to its effects. The rudder would become frozen solid to the vessel; the manipulation of the sails would be impossible, when every rope breaks like a rotten stick; and the blocks would require kettles of hot water to keep them thawed. No steam-engine can work after the water in the ship's bilge commences to freeze, and with us that took place with the thermometer at zero in the open air.

I need not follow that subject farther. Water was seen in the spring in extensive patches off the shore of Albert Land. There is no good authority for believing it otherwise than purely local, caused by the tides being pent up between the islands.

With respect to the geographical features of the northern coast of the Parry group, I would call attention to its uniform but deeply-indented character, from 90° W. long. to 120° W. upon its northern face. A series of long peninsulas jutting generally to the N.W., with narrow seas intervening—these seas being in many places almost joined by contractions or isthmuses of a low character, having on them chains of lakes connected by rivulets. These fiords strongly resemble in character those of Norway, and the south extremity of the American Continent about Cape Horn.

If permitted to theorise, I should say they were occasioned by two great causes—the rush of a water off the land during the summer-thaws, which, during ages, have gradually worked *gullies* into ravines and ravines into fiords; whilst, upon the other hand, the wear and tear of tides and ice have materially aided wherever a rush of fresh water from the land was helping to disintegrate the rock and soil.

I often, when first visiting those regions, wondered at the non-existence of rivers of any great size in those great islands. I witnessed, for nine months in the year, an incessant fall of snow, sleet, and frozen spiculae, and how the escape of such a vast body of water could take place by a few ravines I could not understand. I fancied, then, the interior must in summer be one exten-

sive lake, and that the water, by its own law of seeking a level, penetrated incessantly through the soil, and reached the ocean eventually. But, now we see the indented outline of those shores, all theorizing is unnecessary. *They serve the purpose of rivers.* Into their ever-frozen bosoms are poured, in the short space of an Arctic summer, the thousands, ay, millions, of pigmy rivulets, which drain either shore of the narrow strips of land.

And, moreover, it will be seen at a glance that the number of square miles of land in any one place is but small. The coast-line bears a very large proportion to the extent of all these islands. Had the Parry group been composed of close-grained granite, or the primary rocks, such as Greenland is, it would have been, like the latter, smothered under one huge glacier long ago, owing to the accumulation of snow, which could in the summer neither scoop out channels for itself nor percolate through its soil. Those islands, however, are formed of limestone and sandstone, both easily acted upon by the agency of frost and water; and on every hand the land bore traces of the extraordinary extent to which Nature applies them in working out her own wonderful and perfect plans.

In the fields of Natural History, we had during our three years' sojourn much to marvel at, and many an old theory to abandon. It is not here that I should touch upon these subjects; but I must tell you that we, with others at Melville Island and Banks Land, were able confidently to state as a fact, though previously unknown, that that Providence which tempers the wind to the shorn lamb, has, in his great wisdom, enabled the deer, the lemming, the musk-ox, hare, and even the ptarmigan, to live through with impunity the rigours of an Arctic winter in the Parry Islands. Turning perfectly white, these creatures pass the winter, seeking their food in its frozen state beneath the snow, which often, and especially in the lemming, hare, and ptarmigan, serves to shield them from the cold, or to secrete them from their foes, the wolf and fox.

Melville Island may be said to abound in game, but on the other islands their visits, like those of angels, are few and far between; and as we come eastward, from the sandstone to the limestone of North Devon, poverty in the vegetable kingdom and scarcity of game are very perceptible.

North of North Devon sandstone again appears, and on Table Island the quantity of vegetation and traces of birds were very striking, although not more than seven miles from the stormy-headed and famine-stricken shore upon which we had wintered. Geologists can best explain why, but at last we all learned to look upon limestone with horror; and the men of my sledge party often said to me, "Ah, Sir, we are coming to that blessed limestone again, and banian days too;" for so surely as we met it, so surely was vegetation scarce, and animals naturally likewise.

ERRATA IN PROCEEDINGS, No. II.

On cover—Feb. and March, not April.

At page 44, insert—*Eighth Meeting, March 10. The Rev. J. S. Brewer, M.A., Frederick Manning, A. Roche, Hon. G. Waldegrave, Joshua Walker, and H. J. Williams, Esqrs., were elected Fellows. E. Osborne Smith and T. H. Brooking, Esqrs., on the part of the Council; and H. Raper, R.N., and F. Le Breton, Esqrs., on the part of the Society, were elected Auditors for the year. The Papers read were Nos. 1 and 2, not 5 and 6.*

IN PROCEEDINGS, No. III.

Page 55, *Ninth Meeting*, not Eighth; 61, *Tenth Meeting*, not Ninth; 69, *Eleventh Meeting*, not Tenth.—ED.

PRESENTATION

OF THE

ROYAL AWARDS

TO ELISHA KENT KANE, M.D.; TO HEINRICH BARTH, PH.D.,
AND TO CORPORAL CHURCH, *of the Royal Sappers and Miners.*

HIS EXCELLENCY G. M. DALLAS, Minister of the United States of America, having consented to receive the Gold Medal awarded to Dr. Kane, the President addressed him as follows:—

“ Sir,—The Founder’s Gold Medal, the highest honour this Society has in its power to bestow, has been awarded to Dr. Kane, of the United States of America, for his distinguished services and important discoveries in the Polar regions, while in charge of the expedition fitted out in America to search for Sir John Franklin; and for his valuable Memoir and Charts, communicated through the Admiralty.

“ In the absence of Dr. Kane himself, I could desire no greater privilege than that of confiding the award, Dr. Kane has so justly deserved, to the hands of the distinguished representative of the nation to which he belongs; in order that the feeling of this Society, and I may say of the country at large, may go forth in its fullest extent to the land which enrols the name of Dr. Kane among her citizens. Sir, I cannot discharge this duty without passing a remark on the peculiarity of the circumstances attending this occasion.

“ It seldom happens that nations so distantly situated, spontaneously unite in such acts of humanity as those which have characterized the late search for Sir J. Franklin. More rarely still do we find the sympathies of individuals so enlisted in the fate of foreigners, as to manifest themselves in acts of philanthropy of such a truly liberal and substantial character as have here occurred; and this act of the United States, together with the names of Grinnell and Peabody, will long be remembered in this country, even after the spirit of Arctic enterprise shall have passed away. But, Sir, if the feelings of *nations* have been deeply enlisted in this search, how much more so must have been the feelings of *individuals*, who enjoyed the friendship of the object of it? Sir, there are persons now present who were early associated with our lamented countryman, who shared with him his first perilous encounter with that icy element which was afterwards to become his tomb, and who enjoyed his friendship through life.

"As one of these, you may imagine that it is with no small degree of interest that I find myself now, in my official capacity, conveying this award of the Society, to the officer who so strenuously endeavoured to determine the fate of him, whom we all so deeply deplore.

"These sympathies, however, have had no share in the decision of the Council. Dr. Kane's merits alone, have won for him this testimony of the Society; and I trust that these reciprocal acts of good feeling between nations and individuals may tend to bind in lasting ties of amity these two great nations, whose sympathies have been shown to be so closely identified."

His Excellency the American Minister, having received the Medal, replied :—

"Mr. President,—On behalf of my fellow-citizen, Dr. Elisha Kent Kane, I receive, with equal pride and pleasure, this testimonial, awarded by your learned body, to his ability and services in that branch of human knowledge, to which you are specially devoted.

"His country also, even now engaged in expressing her high sense of his deserts, will be gratified to learn that her judgment, which might, possibly, be ascribed to partiality, has been thus sanctioned.

"Young as he yet is, and fairly entitled to count upon many years of zealous intellectual activity, he can never achieve a prouder recognition, considered in all its aspects, than this Medal of the Royal Geographical Society of London.

"Dr. Kane, as is personally known to me, entered upon his career of Arctic exploration under the influence of sentiments which were strengthened, rather than shaken, by its depicted terrors. In the medical department of the navy of the United States, on a remote station, his Government scarcely intimated a disposition to join in the search for Sir John Franklin, before he hurried forward to volunteer an enlistment for that noble purpose. There was a voice upon the breeze that had caught his ear; an ardent fondness for scientific studies impelled him to a fresh field of research; a daring and irrepressible spirit of enterprise co-operated with much experience and peculiar attainments. He went—he went twice; and, though he vainly offered his own life to rescue another's, he brought back with him observations, verifications, discoveries, and delineations, worthy to be accepted by the masters of geographical science. If, as I believe was the case, he penetrated to and actually beheld the ice-encircled yet open sea, whose existence had been predicated of the periodical northern flight of aquatic birds, of certain currents, and of other *indicia*, he may justly feel that the practical solution of an interesting problem has earned the honour of your approbation.

"I do not wish, Mr. President, to eulogise my countryman. You are far more competent than myself to appreciate the exact value of what he has effected. Your Council have affixed to his record this their Great Seal; and at your invitation, and with alacrity, I assume the grateful task of transmitting it safely to his hands."

The President then addressed Dr. Barth, who was present, in the following words :—

“ Sir,—The Patron’s Gold Medal of this Society has been awarded to you ‘for your successful and extensive explorations in Central Africa, your numerous excursions about Lake Chád, your discovery of the great river Binue, and for your hazardous and adventurous journey to and from Timbuctú,’ by which you have afforded to us the first really authentic information respecting that important locality.

“ In conveying to you this testimony of the high sense entertained by this Society of the merit of your performances, I cannot overlook the important fact that it is just thirty-three years since I found assembled upon the shores of Africa, whence you started, the distinguished but lamented travellers Oudney, Clapperton, Denham, and Tyrwhitt, all bent upon the same great enterprise of opening out the interior of that continent; and although Laing, one of our countrymen, did afterwards succeed in reaching the famed Timbuctú, yet of all this party, and of those who attempted that great exploit, you alone stand upon our shores as the successful accomplisher of the enterprise.

“ If, Sir, the service performed be measured by the difficulty of accomplishment, evidenced by the lapse of time and by the loss of life that has occurred in this adventurous attempt, the award of our Medal must be acknowledged to be justly merited. But you have other performances to strengthen your claim; for we are informed that your labours have been so extensive, that the account of them will reach over five volumes of matter, which, collected in such a country, must prove of the highest import.

“ Sir, I congratulate you on the successful accomplishment of your undertaking, and trust that this high tribute will stimulate you to future enterprises.”

Dr. Barth replied :—

“ Mr. President,—It is with great pride and satisfaction that I am here to receive, at your hands, the Medal which the Council of the Royal Geographical Society has awarded to me; for nothing can be more gratifying to a man who, from love of science, has thrown himself into a dangerous and adventurous career, like that of a traveller in the inhospitable and turbulent regions of Central Africa, than the acknowledgment of such a distinguished body of learned and eminent men as the Council of the Royal Geographical Society. But it is not alone on my own behalf that I thank you; as a member of a foreign nation, who will be honoured by the distinction which to-day you have conferred upon me, I offer you also their acknowledgments as well as my own grateful thanks.

“ I shall say nothing on the extent and purport of my discoveries, which have been fully appreciated by competent men, and will shortly be laid before the public in a full account of my Travels. May I only be allowed to express the hope that, after a great and

practicable high road into the heart of Africa has been found at length, with the sacrifice of the lives of so many noble, eminent, and daring men, and after it has been proved to be such by the successful voyage of Mr. Laird's steamer 'Pleiad,' and after a considerable advance has been made in the knowledge of the interior of the continent, which shows it to be of a far richer character than has ever been supposed, Her Majesty's Government will not allow the opportunity to pass by, to establish, in a vigorous manner, legitimate commerce with those unfortunate regions, and thus hold out to the natives a humane and lawful way in which they may be able to supply their wants of foreign produce, without bringing, by slave-hunts and slave-trade, misery and desolation over wide and fertile districts.

"The present moment is the more important for such exertions, as, by the abolition of the slave-trade in the regency of Tripoli and in Fezzan, the trade of the interior has just been brought to a great crisis, and the people are obliged to look most anxiously about for a new channel by which they may supply their wants. The last news received from Dr. Vogel gives a new proof how extremely anxious the chiefs along the river Chadda or Binue are to enter into friendly relations with the English, but how continually they are disappointed. Certainly the commercial relations of the great western branch of that immense river, the so-called Niger, principally between Timbuctú and Sansandi, are far more developed; but the difficulties which attend the navigation of the lower part of that river, as well between the towns of Bousa and Yauri, as higher up the river between Tosaye and Kendaji, are considerable, although with the means which human genius has made available, they appear by no means insurmountable.

"I conclude, Mr. President, by repeating to you my grateful thanks for the distinguished honour conferred upon me this day."

Corporal Church having requested that Lieutenant-General Sir John Burgoyne would kindly do him the honour to receive the award of the Society on his behalf, the President addressed him as follows :—

"Sir John Burgoyne,—The Royal Geographical Society have awarded to Corporal Church this watch and chain, in acknowledgment of his meritorious and intelligent services while employed upon the African expedition under Dr. Vogel. It is the wish of the Society, especially to mark with approbation, his diligence in conducting a long series of meteorological observations at Kuka, and his ability in assisting Dr. Vogel in those observations, by which he has determined astronomically so many positions on his route.

"It will be satisfactory to you, Sir John, to learn that Corporal Church has amply sustained the high reputation of that excellent corps of Sappers and Miners, whose unassuming labours have so materially contributed to render the detail of the topographical survey of this country so perfect, and have so largely contributed towards the suc-

cess of other geographical undertakings. If anything can enhance the pleasure which I feel in the discharge of this duty, it is that of delivering this acknowledgment of the merits of a zealous and faithful soldier into the hands of so distinguished an ornament of the army, one whose high scientific knowledge and military experience have contributed so largely to the glory of this nation."

Lieutenant-General Sir John Burgoyne, accompanied by Corporal Church, after the delivery of the honorary award, said :—

" Mr. President,—I have not been prepared to take any part in this proceeding ; but although unexpectedly called upon, I cannot refrain from expressing the gratification I feel, that any member of the corps to which I have the honour to belong, should be thought worthy of so flattering a mark of distinction as that now conferred. I can assure the Meeting, that the corps of Royal Engineers and Sappers are as ready to devote themselves to scientific enterprise, as they are for military service in the field.

" With regard to Corporal Church, I believe him to be a zealous, good soldier, a man of intelligence, and one who would be always anxious to carry out the orders or wishes of his superiors ; and that he would never bring discredit on the marks of favour thus shown to him, by so distinguished a body as the Royal Geographical Society."

A D D R E S S

TO THE

ROYAL GEOGRAPHICAL SOCIETY
OF LONDON;*Delivered at the Anniversary Meeting on the 26th May, 1856,*BY REAR-ADMIRAL F. W. BEECHEY,
V.P.R.S., F.R.A.S., &c.

PRESIDENT.

GENTLEMEN,—Before I address you upon the subject of the progress and condition of that science which we more immediately cultivate, I desire to convey to the Vice-Presidents and Members of the Council for the past year, my acknowledgment of the great assistance I have invariably received from them, especially during a long and serious illness. To them, and to the unremitting attention of our Secretary, is owing entirely the satisfactory conduct of the business of the Society during that period. How well your interests have been attended to, is manifest by the Report of the Council, in which you will find that, whilst the sphere of usefulness of the Society has been enlarged, its permanent fund has been increased, and the list of Members has been extended. You will have learned also that our map-room and library have been enriched by the receipt of the valuable collection of maps and books bequeathed to the Society by Mr. Greenough; to whose memory the Council have directed a marble bust to be executed and placed in a suitable part of the building, as a justly merited testimony of the high regard and respect the Society entertain for this eminent geographer. This extensive collection has been arranged for ready access, and embodied in the general catalogue, under the judicious management of the map-committee and our curator, Mr. Saunders.

You will have been made aware, by the receipt of the ‘Proceedings,’ that the Council have carried into effect their determi-

nation, conveyed to you at an evening meeting during the session, to issue this publication. They considered that such a work would be acceptable to the Members, and beneficial to the interests of the Society, as a means of conveying early notices of the papers read at the evening meetings, and of the discussions upon them; also as an additional means of readily disseminating geographical information to the Public, who are at liberty to purchase the numbers; and our thanks are due to Mr. Galton, and the Rev. Messrs. Clark and Nicolay, and to our Secretary, for the readiness with which they have undertaken the compilation and editorship. In starting a publication of this description, the Council have been careful to put on record, the restrictions under which this work is to be published, that it may be kept within due control, and strictly confined to the object for which it was intended. I conclude this notice of our household matters with recording the gratifying fact that the obelisk to the gallant Bellot has been erected at Greenwich, and the fund distributed; and thus a great national testimonial has been raised to the memory of that devoted individual, and a benefit bestowed upon his family.

OBITUARY.

It is my painful duty to inform you that, during the past year, the list of Members who have passed away is unusually large. Among them are many names well known to science and to the world at large, of whose merits I can give little more than a very limited sketch.

In alphabetical order I have first to mention,

ADAMSON, John, Esq., one of the earliest Fellows of this Society, and a relative of the celebrated traveller, Sir Robert Ker Porter. Mr. Adamson was the last surviving son of Lieut. Cuthbert Adamson, R.N., who accompanied the Hon. Capt. Phipps, afterwards Lord Mulgrave, in 1773, as 2nd Lieutenant of the 'Racehorse,' in his voyage of discovery towards the North Pole. He was born September 13th, 1787, at Gateshead, and was sent at an early age to Lisbon. From his youth he was devotedly attached to the pursuits of literature, became a member of the Literary and Philosophical Society of Newcastle in 1811, and one of its secretaries in 1825, remaining in office up to the period of his death. Mr. Adamson's brief visit to Portugal in 1803 had left impressions on his mind which were never effaced, and gave him that taste for Portuguese literature which he retained during the remainder of his life. In 1820

appeared the work on which his fame chiefly rests—the *Memoirs of the Life and Writings of Camoens*, the merits of which have been appreciated at home and abroad. In 1836 he printed for private circulation, under the title of '*Bibliotheca Lusitana*,' a catalogue of the books in his library relating to Portugal—an interesting piece of bibliography.

Mr. Adamson's last literary work was a labour of love. He ushered into the world the first five cantos of the '*Lusiad*,' translated by his friend Mr. Quillinan, whose lamented death prevented him from completing the task he had imposed upon himself. He was also the editor of several of the publications issued by the Typographical Society of Newcastle. His literary correspondence extends over half a century, and includes letters from geographers, antiquaries, numismatists, naturalists, poets, men of letters and science, and other distinguished persons in various parts of the world. He was a corresponding member of the Royal Society of Northern Antiquaries at Copenhagen, of the Literary Society of Iceland, of the Royal Academy of Inscriptions, Belles Lettres, &c., at Stockholm, of the Royal Society of Literature of Courland, of the Royal Academy of Sciences of Lisbon, of the Archaeological Academy of Madrid, a member of the British Association for the Advancement of Science, as well as a Fellow of the Royal Geographical, the Linnean, and the Antiquarian Societies.

BARCLAY, Charles, Esq., F.S.A., formerly of Bury Hill, was the head of the world-known firm of Barclay, Perkins, and Co.

In 1815 Mr. Barclay was elected a member of Parliament for the borough of Southwark. He possessed a liberal and enlightened mind and a benevolent disposition. He was an active and intelligent magistrate for the county of Surrey, and a generous promoter of education. His death was occasioned by a fall from his horse.

BUCKINGHAM, James Silk, Esq., was born near Falmouth, in 1786. In his youth, he passed several years at sea, and also in a variety of occupations on shore; among which, his working as a compositor in printing offices proved of most influence on his career through life. He first became known in public affairs, by his attempts to open up the journalism of India. Mr. Buckingham first went to Calcutta about the year 1815, and always retained much interest in Indian affairs, and hailed with warm satisfaction the removal of the restrictions on the press in India, which the wise and liberal policy of Lords Metcalfe and William Bentinck at length effected. In 1825 he established in London a paper, the '*Oriental Herald*,' the pre-

cursor of the 'Athenæum,' and of various other journals. On his way to and from India, Mr. Buckingham travelled through different countries, and afterwards published narratives of his travels. In 1822 appeared 'Travels in Palestine;' in 1825, 'Arabia;' in 1827, 'Mesopotamia and adjacent Countries;' and in 1830, 'Assyria and Media.' At a later period, he made tours in various parts of Europe and North America, his account of the latter occupying no fewer than ten volumes, three devoted to the Northern States of the Union, three to the Slave States, three to the Eastern and Western States, and one to Canada, Nova Scotia, and New Brunswick. The European travels are described in two volumes on Belgium, the Rhine, and Switzerland. All these contain much valuable descriptive and statistical matter, the author having paid more attention than is usual with tourists, to the social condition of the countries which he visited. Mr. Buckingham was one of the most pleasing and instructive popular lecturers, especially in describing places which he had visited. In 1832, he was elected M.P. for Sheffield in the first reformed Parliament, and retained his seat till 1837. In his political life, he chiefly took an active part in questions affecting social reforms; and the temperance movement had in him a zealous advocate. In 1849, he published a volume, entitled 'National Evils and Practical Remedies,' in which he expounded his views on a variety of topics of public interest. Mr. Buckingham died on the 30th of June last, aged 69. His last work, published a few months before his death, was his 'Autobiography.'

CARR, Commander Washington, entered the navy in 1811, and in May, 1843, was appointed to the command, in the West Indies, of the 'Hermes' steam-sloop. Commander Carr was known as an amiable man and a sincere friend.

CHATTERTON, Sir William A., Bart., an early Fellow of this Society, died in August last, at Rolls Park, Essex. He was born in 1787, and was the second Baronet, a Deputy-Lieutenant of the county of Cork, a Vice-President of the Royal Literary Fund, a Fellow of the Zoological Society, and a member of the Imperial Academy of Sciences of St. Petersburg.

COLQUHOUN, the Chevalier James de, LL.D., &c., one of the earliest Fellows of this Society, was the only son of Dr. Patrick Colquhoun, late Lord Provost of Glasgow, one of the first who applied himself to the development of the statistics of the British empire. He founded and carried out the present system of Thames Police, whereby the mercantile interest is now so efficiently protected; and

suggested in his work on the Metropolitan Police, the adoption of an improved system for the protection of public property and of personal safety, subsequently carried out by the late Sir Robert Peel.

In 1800, he became the private secretary of Mr. Dundas, then the Secretary of State for the War Department; three years later, he received the appointment of Deputy Agent-General for the payment of volunteers. In 1817, the Hanseatic republics constituted him their representative here, and the legislatures of St. Vincent, Dominica, St. Christopher, Tortola, Tobago, Nevis, and the Virgin Islands, at different times nominated him to watch over their interests. In 1827, he was appointed Consul-General of the King of Saxony; and in 1848, his Royal Highness the late Grand Duke of Oldenburg appointed him his Chargé d'Affaires. He was Knight Commander of the first class of the Royal Saxon Order of Civil Merit. On the signature by Reshid Pasha, of a treaty of recognition between the Hanseatic republics, as their Plenipotentiary he received the Order of Iftihar of the first class from the Sultan; and the Hanseatic republics conferred on him the honorary diploma of citizenship, to which the Senate of Lübeck and Hamburg added their honorary medal. The University of Glasgow also conferred on him the honorary degree of LL.D.; and the Royal Antiquarian Society of Athens constituted him an honorary fellow. As Hanseatic Plenipotentiary he signed the commercial treaties with Great Britain, the Ottoman Porte, Mexico, and Liberia; and he also signed a treaty, as Saxon Plenipotentiary, with Mexico. He died on the 23rd of July, 1855, in the 76th year of his age.

ESTCOURT, Major-General J. B. Bucknall, died before Sebastopol last June, of that disease—cholera—which carried off so many of our brave countrymen, in his 53rd year.

General Estcourt, educated at Harrow, entered the army as an ensign, and served in the expedition to the River Euphrates from 1836 to 1837; he went out in 1854 on the staff of Lord Raglan; and served as Adjutant-General of the Forces, from the first landing in the Crimea, sharing the glories and dangers of Alma, Balaclava, and Inkermann. In 1848 he was elected a member of parliament for Devizes.

FRASER, James Baillie, Esq., of Reelick, Inverness, a Deputy-Lieutenant of that county, died in January last, in his seventy-second year. He was born in June, 1783, and was the eldest of four brothers, all remarkable men, sons of the late Edward S. Fraser. James Baillie went early in life to the West Indies; but

after a short residence there he resolved, like his brothers, to proceed to the East, whence he returned to this country, about the year 1822. Mr. Fraser again went to India, and was employed in a diplomatic mission, in the course of which he rode on horseback from Constantinople to Ispahán, the fatigues and hardships of which gave the first shock to his vigorous constitution. When the Persian princes visited this country, he was requested by Government to accompany and take charge of them; and on their return, he went with them as far as Constantinople. Latterly, Mr. Fraser became a zealous improver of his Highland estate, which is almost unequalled for its magnificent woods and romantic burn scenery.

In 1820, Mr. Fraser published a 'Tour through the Snowy Range of the Himalaya Mountains;' in 1825, a 'Narrative of a Journey into Khorasan in the Years 1821 and 1822, including an Account of the Countries to the North-East of Persia;' and in 1826, 'Travels and Adventures in the Persian Provinces.' In 1838, appeared his work, 'A Winter Journey from Constantinople to Tehrán, with Travels through various parts of Persia.' He wrote also a History of Persia, contributed various pieces to the *Annals*, and ventured once more into the regions of fiction by a Scottish story, 'The Highland Smugglers.' His last work was a military memoir of Colonel Skinner, a distinguished Indian officer, who died at Delhi in 1841, and was buried by the side of his friend William Fraser.

Mr. Fraser was as accomplished as an artist, as he was as an author. He was an exquisite painter in water-colours, and several of his drawings of Eastern scenes have been engraved.

HALL, Dr. George, was well known as an accomplished traveller. Elected, in 1822, a Radcliffe Travelling Fellow of Oxford, he went abroad, and, after visiting the greater part of Europe, joined the Count Alexander de la Borde, who, with his son Count Léon and the Duke de Richelieu, were about to travel in the East. Dr. Hall accompanied that distinguished party throughout the whole of their well-known journey through Egypt and Asia Minor, which gave him opportunities of visiting some parts of those countries then little known.

Whilst at Jericho he made an excursion to the ruins of the cities of Geraza and Amman, in the country E. of the Jordan, of which he printed an account in 1851, for private circulation. It is to be regretted that with the exception of a description of Azani, which appears in Colonel Keppel's 'Journey across the Balkan,' no other portions of his travels have as yet been published.

His varied and extensive knowledge and a most amiable disposition made his society always much sought after, and endeared him to a large circle of friends who will long deplore his loss.

HAMMOND, William, Esq., was elected a Fellow in the year 1838.

HARRIS, Captain Fortescue William, was born in 1821, educated at the Royal Naval School, and afterwards entered the merchant service. After many voyages to China, the East and West Indies, he was appointed to the command of the 'Madagascar' in 1852; went to Calcutta and back, and sailed on the 6th of March, 1853, for Melbourne, Victoria. He left Melbourne homeward-bound on the 12th of August the same year, since which time nothing has been heard of the crew or ship, which is supposed to have foundered while coming round Cape Horn.

IRVING, Edward George, M.D., R.N., was born 1st April, 1816, in the parish of Hoddam, Dumfriesshire, where he commenced his education and continued his studies for several years. He then went to the University of Edinburgh, and remained there until he obtained the degree of M.D. In 1840, he entered her Majesty's navy, and joined H.M.S. 'Britannia.' On the 14th October, 1840, he was appointed to H.M.S. 'Bellerophon,' Captain C. Austen, and was present at the siege of Acre. In August, 1841, he joined H.M.S. 'Isis,' Captain Sir John Marshall, on the Cape of Good Hope station, and remained in her three years. His next appointment was in 1845, to H.M.S. 'Tortoise,' for service on the Island of Ascension. He continued on the African coast until June, 1848, during which time fever prevailed to a great extent, and his own health suffered severely. He remained in England until May, 1850, when he again returned to the West Coast of Africa in H.M. steam-sloop 'Prometheus,' Captain Henry Foote: that officer having been ordered to proceed on a mission to Abbeokuta, Dr. Irving accompanied him thither; and on his return to England, in January, 1853, he wrote an account of their journey, which was published in the 'Church Missionary Intelligencer.'*

The testimony of Captain Foote and Dr. Irving proved that the natives of Abbeokuta and the Yoruba tribe generally, are an enterprising, industrious, and tractable people, and that the effect of missionary labour had been, to turn their thoughts from war and kidnapping to peace and the pursuits of lawful commerce. They

* *Vide* 'Church Missionary Intelligencer,' June, August, and October, 1853.
—ED.

had also entered into treaty with the English Government, and friendly relations had been established with the British consuls on the coast, as well as with her Majesty's cruisers engaged in the suppression of the slave trade.

In this state of things the missionaries were the only persons able to give the natives advice upon their political and commercial affairs; yet it was obviously desirable that, as religious teachers, they should be relieved as far as possible from such temporal cares; and for this purpose the Committee of the Church Missionary Society determined to send out a lay agent, who, while on friendly and confidential terms with the missionaries, might also be authorised to communicate with the Consul and naval officers, as well as with the Home Government, upon matters which may tend to promote British interests and commercial relations with the native tribes.

Dr. Irving's experience of nine years upon the West Africa coast, and the interest which he had taken in native civilisation and Christianity, pointed him out as a most eligible person for such an office. It was, therefore, proposed to him to go out for three years on this mission, and he readily acceded to the proposal. The Lords Commissioners of the Admiralty having granted the leave of absence, Lord Clarendon, as her Majesty's Secretary for Foreign Affairs, gave his sanction to the arrangement, and furnished Dr. Irving with letters of introduction to the consuls. Furnished by the Hydrographic Office and by this Society with instruments, with the use of which he had made himself perfectly acquainted, Dr. Irving proceeded to Africa in January, 1854, and diligently improved every opportunity for gaining the confidence of the natives, for promoting internal peace, and for inducing the chiefs to open and protect roads from various towns in the interior, to the coast. His period of labour was very short. He fell a victim to the climate after fifteen months' residence, and his death was deplored by all the native chiefs as a national calamity. His botanical collections have been sent to our learned associate, Sir William Hooker, at Kew.

KING, Philip Parker, Rear-Admiral of the Blue, F.R.S.—Admiral King, the son of Philip Gidley King, Esq., Post-Captain in the Royal Navy, was born at Norfolk Island on the 13th of December, 1793, and was consequently in the 63rd year of his age. In early life, when only in his sixteenth year, his gallant conduct in boat actions, had obtained the favourable notice of the officers in command. In later years, he conducted a survey of the coasts of Australia, and subse-

quently of the southern coasts of America. In February, 1817, he was entrusted with the conduct of an expedition having for its object a survey of the coasts of Australia, a service on which he continued employed in the 'Mermaid,' cutter, and 'Bathurst,' sloop—to the command of which he was promoted by commission, dated 17th July, 1821—until his return to England in 1823. The results of the undertaking are contained in a Narrative of the Survey of the Inter-tropical and Western Coasts of Australia, and in an Atlas, both compiled by Captain King, and published, the former by Murray, and the latter by the Hydrographic Office of the Admiralty. In September, 1825, from the feeling of confidence with which he had impressed the Admiralty, in the discharge of his late duties, he was appointed to the 'Adventure,' sloop, and ordered to survey the southern coast of America, from the entrance of the Rio de la Plata round to Chiloe, and that of Tierra del Fuego. He was paid off on his arrival in England, 16th November, 1830, and has not been since employed. His post commission bears date 25th February, 1830.

In 1832, Captain King published, as the partial fruit of his recent voyage, a volume entitled, 'Sailing Directions to the Coasts of Eastern and Western Patagonia, including the Straits of Magellan, and the Sea Coast of Tierra del Fuego.'

On his retirement from active service, Captain King returned to Australia, and shortly after his arrival, succeeded Sir Edward Parry as manager of the affairs of the Australian Agricultural Society, the duties of which office he discharged with characteristic and exemplary ability and attention for several years. He was appointed a nominee member of the Legislative Council by the governor, Sir Charles FitzRoy; but latterly he held his seat in the House in the more honourable capacity of a representative member, having, at the general elections of 1851, offered himself as a candidate for the constituency of Gloucester and Macquarie, and on that occasion was returned by a large majority over his opponent, Mr. Joseph Simmons. During the last session of Council, he strongly supported, in particular, the proposition for the establishment of a nautical school. For some time past he held the office of chairman of the Denominational Board of Education, and was consequently regarded as the representative of that body in the Council.

His was the first instance of a native of Australia rising to so distinguished a rank in the British navy, and every one must feel a deep regret that his enjoyment of the honour was for so brief a period.

Both in public and in private life, Admiral King merited, as he obtained, the cordial regard and high respect of all to whom he was known, whether personally or by repute.

LAWRENCE, the Hon. Abbott, who died at the age of 63, was the fifth son of Samuel Lawrence, and was born in Groton, Massachusetts, became a member of the Common Council of Boston in 1831, and in 1834 was elected to Congress, and served the term. He declined a re-election, but consented in 1839 to be a candidate to fill the vacancy caused by the resignation of Richard Fletcher, was elected, and took his seat in the House in December of that year. Upon his entrance into Congress he was put on the Committee of Ways and Means.

Mr. Lawrence, in 1842, was appointed a commissioner on the part of Massachusetts, to arrange the North-Eastern Boundary Question, and rendered most efficient service. In 1849, he was invited by General Taylor to take a seat in his Cabinet. He declined the offer, but accepted the appointment of Minister to Great Britain, the duties of which office he performed honourably to himself, satisfactorily to this, and advantageously to his own country. Mr. Lawrence was public spirited, liberal, charitable, and benevolent. In all schemes of public improvement he took a deep interest, and aided them with his hand and purse. His foundation of the Lawrence Scientific School, at Cambridge, by a gift of 50,000 dollars, and the bequest of an additional 50,000 dollars in his will, his establishing prizes for the deserving scholars of the public schools, and the aid always generously given by him to churches and to religious and charitable associations, are well known.

LOCH, James, Esq., died last July at his residence in Albemarle-street, aged 75. He was an Advocate and Barrister-at-Law, and Fellow of the Royal Geographical, Geological, Statistical, and Zoological Societies of London; formerly M.P. for the Kirkwall and Wick district of burghs.

Mr. Loch was the author of a 'Memoir of George Granville, late Duke of Sutherland,' 4to. 1834; and his second son was the late Captain G. G. Loch, R.N., F.R.G.S., Surveyor of the River San Juan de Nicaragua, and author of 'The Closing Events of the Campaign in China,' 1843, 8vo.

MITCHELL, Colonel Sir Thomas L., D.C.L., F.R.S., Surveyor-General of New South Wales, and one of the earliest members of this Society, died in October last, aged 63. He joined the army in the Peninsula when only sixteen, served on Wellington's staff to the close of

the war, and was subsequently sent back to survey the battle-fields of the Peninsula. His model of the Lower Pyrenees is in the United Service Museum. In 1827, he was sent to survey Eastern Australia, having the appointment of Deputy Surveyor-General. A report of all his surveys is to be published by the Australian Legislature. Sir T. Mitchell made several exploring expeditions into the interior of the country, of which valuable narratives have been published.

In Australia, the name of Sir Thomas Mitchell will be remembered with respect, as one of the earliest and most useful explorers of these rapidly-rising colonies.

MOLESWORTH, the Right Hon. Sir William, Bart., M.P., F.R.S., died in October last, at his residence in Eaton-place, in his forty-sixth year. Sir William was the eighth baronet of Pencarrow, Cornwall, her Majesty's principal Secretary of State for the Colonies, and M.P. for Southwark, a deputy-lieutenant and magistrate of Cornwall, &c.

On his entry into public life, Sir William joined with that section of philosophical Radicals, who were for a period united by subscription to the doctrines of Bentham; he contributed to the 'Westminster Review,' and published at his own cost an elaborate edition of the works of Hobbes. He took office, with a seat in the Cabinet, some three years ago; and, last spring, was raised to that particular office, the Colonial Secretaryship, for which universal consent pronounced him to be so eminently fitted. Sir William, on the recommendation of Sir Roderick Murchison, appointed our Associate, Dr. C. P. Sutherland, who had previously accompanied Captain Penny and Captain Inglefield to the Arctic regions, as Government Geologist and Surveyor at Port Natal, a post for which his abilities eminently qualified him.

NEELD, Joseph, Esq., M.P., F.S.A., F.L.S., died, at his residence in Grosvenor-square, last March, aged 67. Mr. Neeld was a Deputy-Lieutenant of Wiltshire, M.P. for Chippenham, and High Steward of Malmesbury.

OUTRAM, Sir Benjamin Fonseca, M.D., R.N., C.B., F.R.S., also one of the earlier Fellows of this Society, died at Brighton in February last, aged 82. He was the son of Captain W. Outram, was first employed in the medical naval service in 1794, and rose to the rank of surgeon in 1796. He graduated at the University of Edinburgh in 1809, became a licentiate of the College of Physicians in 1810, and was a few years since elected a Fellow. During the long war he was actively engaged in his professional duties, and received

a medal and clasps for the actions in the 'Nymphe,' the 'Boadicea,' and the 'Superb.' He was appointed Inspector of Fleets and Hospitals in 1841, and in 1850 nominated a Companion of the Bath and a Knight Bachelor. Sir Benjamin took a lively interest in the pursuits of this Society, and constantly attended its evening meetings. He was a true friend and a kindhearted man, and in his will bequeathed various sums to several charitable institutions.

PARRY, Rear-Admiral Sir William Edward, Kt., D.C.L., F.R.S., &c. &c.—It is now my melancholy duty to pay a tribute of respect and regard to our great Arctic navigator, Sir Edward Parry, whose memory will ever be coupled with the records of Arctic adventure of the nineteenth century. Early associated with Sir E. Parry as a messmate, afterwards his first lieutenant during the memorable voyage to Melville Island, and his friend through life, I shall, I am sure, be excused for dwelling on his distinguished career. He was born at Bath in the year 1790, and entered the Royal Navy at the age of twelve, under the patronage of Lord Cornwallis. Zealous in his profession, intelligent and ambitious, Parry soon recommended himself to notice, and in January, 1810, he was promoted to the rank of Lieutenant and appointed to the 'Alexander,' employed in protecting the Spitzbergen whale fishery. It was here that he first became acquainted with that frozen ocean, amidst whose dangers and difficulties he was destined to earn celebrity. Subsequently serving in the 'Hogue,' he assisted in destroying twenty-seven of the enemy's vessels, three of which were heavy privateers. This, and a few skirmishes with the Danish gunboats, are the only actions with the enemy which fell to his lot.

On his return to England in 1817, the extraordinary changes reported to have taken place in the state of the Polar Sea, determined the Government to equip an expedition for Arctic discovery. Then was the turning-point in Parry's life. Like most men of enterprise, he seized the occasion and determined to devote himself to Arctic adventure. There are but few who have not, at some time, the chance of distinction, and Parry took advantage of his. We accordingly find him in command of the 'Alexander,' and, under the orders of Sir John Ross, leaving England in quest of the North-West Passage, by way of Davis Strait; the result of this expedition, it is well known, was the restoration to our map of the outline of Baffin Bay, and the re-discovery of the famed Lancaster Sound.

Dissatisfied, however, with the account which had been given of

the result of this voyage, and anxious to remove an erroneous impression conveyed by Sir John Ross on the subject of Lancaster Sound, he made such representations to the Admiralty as induced Government to send another expedition to the same place. Of this expedition Sir E. Parry was appointed chief. During the voyage, an opportunity occurred for displaying that vigour and determination in overcoming difficulties, which, though they might daunt the generality of men, were unable to turn him from his purpose. In the upper part of Baffin Bay there presented itself what appeared to be an impenetrable barrier of ice; undismayed by the dangers that threatened, he dashed into the midst of it, accomplished his purpose, and entering Lancaster Sound in safety, succeeded in passing over that imaginary chain of mountains with which Ross had closed the strait.

The demolition of these phantom mountains, and the discovery of the opening into the Polar Sea on the west, of Prince Regent Inlet on the south, and of Wellington Channel on the north, together with Parry Islands (the Ultima Thule of Arctic discovery) and Banks Land, the terminating points of Sir E. Parry's and Sir R. M'Clure's explorations from opposite directions, were the consequences of the first summer of this expedition. Having passed the meridian 110° W., the Commander and his associates became entitled to the award of 5000*l.* offered by Government for the encouragement of Arctic enterprise. The winter they were destined to pass in this dreary region afforded another opportunity for Parry to display those qualities which so eminently fitted him for the work he had selected, since, by his admirable arrangements for the health, comfort, and amusement of his men, he was enabled to keep the crews in vigour, mental and bodily, while, by the vast number of observations he carried on, he determined his geographical position with a precision worthy of a better object.

In the following spring, by an overland journey, he discovered Liddon Gulf, where his broken cart remained to be seen by M'Clinck, thirty years afterwards. Finding any farther advance with his ship impossible, he determined in the latter part of the summer of 1820 to return to England, where he arrived in safety, and received, on all sides, a most enthusiastic greeting. He had but little rest, however, for in the May following he was again appointed to command another expedition, which was to proceed by way of Hudson Strait and Sir T. Rowe's Welcome. Although this voyage, like the last, failed in its main object, much valuable geographical know-

ledge resulted from it, and considerable information as to the Esquimaux tribes of that region was obtained. On returning to England Parry was promoted to the rank of Captain, and in another year found himself once more on his way to the frozen North, in order, if possible, to co-operate with an overland expedition under Franklin. This was the last of Parry's North-Western voyages. The subject of our memoir was now confirmed in the office of Hydrographer to the Admiralty, which had before been temporarily held by him; still, however, directing his attention to Arctic research, he offered to carry out a scheme, which had been proposed in 1818 by Franklin and myself: namely, to attempt reaching a high northern latitude by travelling over the Spitzbergen ice. He accordingly sailed in 1827 for Hammerfest, and doubtless would have succeeded in his object, but that an unexpected impediment presented itself; for the ice over which he travelled was found to move southward at almost the same rate he advanced northward, and he was most unwillingly compelled to retrace his journey, having proceeded to $82^{\circ} 45' N.$ lat.—farther towards the Pole than any of his predecessors.

In 1829, Parry was appointed Commissioner for the management of the affairs of the Australian Agricultural Company, and, in pursuance of the duties of the office, took up his residence at Port Stephen, 60 miles to the north of Sydney. Before leaving England, he received the order of knighthood, and was created D.C.L. of Oxford.

Returning once more to England, after an absence of five years, he was made Poor Law Commissioner in the county of Norfolk, but did not long hold an appointment which was uncongenial to his tastes. Soon after this, Sir E. Parry was selected to organize and conduct a newly-created department of the Admiralty, under the title of Comptroller of Steam Machinery, and it was during the time that he remained in this office, that the screw-propeller, now indispensable to our fleets, was introduced into the navy.

In 1847, in consequence of failing health from over-work, he resigned this also, and became Captain-Superintendent of Haslar Hospital; and, in 1853, the Lieutenant-Governorship of Greenwich Hospital falling vacant, he accepted it.

Disease, however, had begun its ravages, and, under the direction of his medical advisers, he determined to try the waters of Ems. On his way to these baths he was detained by exhaustion at Coblenz, and only reached Ems to die.

Thus ended the career of one of the most distinguished officers of his age, who had spent his days in active usefulness, and whose life

was remarkable not only for its varied character, but also for the genuine and unaffected piety which pervaded it.

Among the works which Sir E. Parry left behind him, we may enumerate a small volume on 'Astronomy by Night,' another on the 'Parental Character of God,' and an 'Address to the Sailor,' besides the narrative of his voyages, which, in value, compete almost with those of Cook. We find him also associated with three papers in the Transactions of the Royal Society.

PHILLIMORE, Joseph, Esq., D.C.L., was the eldest son of the Rev. Joseph Phillimore. He graduated in Civil Law, becoming B.C.L. in 1800, and D.C.L. in 1804. He had been distinguished for his scholarship, and especially for the talent for composition which he displayed, as well at Westminster, as after his removal to Christ Church, where he gained the College prize for Latin verse. In 1798 he obtained also the University prize, which was adjudged to his English essay on 'Chivalry.' After some residence in foreign parts, he settled in London, and was admitted an advocate in Doctors' Commons 1804. On the death of Dr. Lawrence, in 1809, he was nominated judge of the Cinque Ports by Lord Hawkesbury; Chancellor of the Diocese of Oxford by Bishop Moss; and Regius Professor of Civil Law at Oxford—an office upon the reputation of which his classical taste and language have shed additional lustre.

On the installation of the Marquis Camden as Chancellor of the University of Cambridge in 1834, Dr. Phillimore was invited to Cambridge, to receive an honorary degree from the sister University.

PUSEY, Philip, Esq., D.C.L., F.R.S., of Pusey Park, Berkshire, died July last, at his brother's residence in Christ Church, Oxford, aged 56. He succeeded to the family estates on the death of his father in 1828, and entered parliament in 1830, as one of the members for Chippenham.

As a practical agriculturist, Mr. Pusey was highly distinguished. He was the President of the Royal Agricultural Society in 1853, and he edited and largely contributed to the Journal of that Society. He was universally beloved, for there was a natural frankness and warm-heartedness with him, that developed themselves in every relation of life; and among his tenantry it was impossible for any one to be more highly esteemed.

SANTAREM, le Vicomte de, Manoel Francisco de Barros e Sousa da Mosquita de Macedo, Leitao e Carvalhaza, Corresponding member of this Society.

This learned Portuguese, born at Lisbon in 1792, was a member

of one of the most ancient and illustrious families of Portugal. After having received an excellent education, he was sent as minister of Portugal to the Court of Denmark; recalled after the revolution of 1820, he was appointed, in 1823, keeper of the archives of the realm, having already, in 1821, during a sojourn in Paris, collected numerous documents bearing upon the history of Portugal from among the MSS. in the 'Bibliothèque Royale.' In 1827, he was appointed Minister of Foreign Affairs, but shortly afterwards, upon his retirement, he proceeded to Paris, where he joined the Geographical Society in 1835, and was afterwards elected Vice-President. The library of our Society is enriched with numerous works from his pen; and it was but last year that my predecessor in this chair directed the attention of the world to his beautiful work on the 'Discoveries of the Portuguese,' and other labours, which have been so suddenly interrupted by his death, which took place in February, 1856.

SYMONDS, Rear-Admiral Sir William, K.H., C.B., F.R.S.—late Surveyor of the Navy—died in March, on his voyage from Malta to Marseilles, aged 74. Sir William entered the navy at an early age, and, during the early part of his career, was much engaged in active service on the coasts of France, Spain, and in the West Indies. He obtained post rank in 1827; and in 1831, Capt. Symonds was enabled, through the munificence of the Duke of Portland, to build the 10-gun brig 'Pantaloön,' the triumph of which vessel led to the construction, under his superintendence, of the 'Vernon,' 50; 'Vestal,' 26; 'Snake,' 16, and others. On June 9th, 1832, he was offered, and accepted, the appointment of Surveyor of the Navy, which he continued to fill until 1847.

Sir William Symonds received the honour of knighthood for his services, and the thanks of the Admiralty in 1830 for a memoir containing 'Sailing Directions for the Adriatic Sea;' and again, in 1837, for "the valuable qualities of his several ships, and for improvements introduced by him into the navy." He was elected a F.R.S., 1835, and nominated a C.B. on the Civil division, 1848. In 1854 he became a Rear-Admiral on the retired list.

URCULLU, Don José de, was born in Hamburg on the 8th April, 1787. His father, D. Manuel de Urcullu, the Spanish Consul in that city, brought him, at an early age, to Bilboa, where he had possessions. On the death of his father, he was sent to be educated to the college of São José de Calasan, in Saragossa, where he graduated in the faculty of Philosophy. In 1807, having

completed his studies, and being then little more than 20 years of age, he entered the regiment of Saragossa, and was made prisoner by the French in 1808. He continued in the military profession till the year 1820, when he left it, having attained the rank of Captain, and dedicated himself, with all the ardour of a studious mind and a lively imagination, to the pursuit of literature; writing and translating various works in prose and verse. These works gained for him the distinction of being nominated a Corresponding member of this Society; of the Geographical Society of Paris; and of Rio Janeiro. In the year 1822, when secretary to the Captain-General, he married the eldest daughter of Mr. Richard Allen, the English Consul at Corunna; and the Consul dying soon after, he proceeded with his wife and family to establish himself in the city of Oporto, but was obliged to emigrate to England in the following year in consequence of political disturbances. He returned to Oporto in 1827, and was appointed manager of the Fiscal Department of the Royal Tobacco Contract, and subsequently Administrator of the Commercial Press of Oporto. In the same year he was appointed Consul of the Republic of Peru at Oporto. In 1847 he returned to Oporto from Puerto de Sta. Maria; and in 1850, at the request of a private friend, resident in Bilbao, he went to that city to open and direct a college for superior education, which, undertaking he carried out with the most praiseworthy success. Finding, however, himself in ill health, he returned in 1851 to the bosom of his family, and, after long and severe suffering, he died, much lamented by his relatives and friends, by whom he had been always esteemed for his many virtues and high character. He was buried in the cemetery of Nostra Senhora da Lapa, in the city of Oporto.

WHARNCLIFFE, John Stuart, Lord, F.R.S., second Baron Wharncliffe of Wortley, county of York, died in October last, at his residence, Wortley, Sheffield, at the age of 54.

His Lordship was greatly attached to agriculture, seeking all the newest modes to improve the culture of the land. He addressed a letter to Philip Pusey, Esq., on Drainage, published in the Journal of the Royal Agricultural Society.

WIDDRINGTON, Captain Samuel E., R.N., F.R.S., died January last, at his residence, Newton Hall, near Felton, Northumberland. He was the eldest son of the Rev. Joseph Cook, M.A., of Newton. In October, 1829, Captain Cook went to Spain, and having subsequently resided for three years in that country, he published, in 1834, in two volumes octavo, 'Sketches in Spain during the years 1829-30-31

and 32, containing Notices of some Districts very little known; of the Manners of the People, Government, recent Changes, Commerce, Fine Arts, and Natural History.' This work, which was dedicated to Lord Prudhoe (afterwards Duke of Northumberland), was the most complete account in our language.

In 1843 (having then assumed the name of Widdrington) he repaired to Spain again, and, in the following year, published another book, entitled 'Spain and the Spaniards in 1843,' in 2 vols.; also dedicated to the Duke of Northumberland.

Captain Widdrington was a magistrate and deputy-lieutenant of Northumberland.

WIELHORSKI, the Count de, who died in the Crimea, whither he had been despatched by the Empress of Russia upon a charitable mission of relief to the sick and wounded of the Russian army. This amiable young nobleman was well known to this Society in connection with his kind services in procuring the necessary letters of introduction to the governors of Russian America for various Arctic commanders, as well as for his presentation to our library of the 'Agricultural and Statistical Atlas of European Russia,' with a translation into good English, made by himself at the request of our Secretary.

YATES, Joseph Brook, Esq., F.S.A., the last name on our list, and one of the earlier Fellows of this Society, died in December last at Liverpool, aged 75.

Mr. Yates was educated at Eton, and subsequently became actively engaged in commercial pursuits, which however in no wise diminished his taste for literary and scientific subjects. In 1812, he and Dr. Traill, now of Edinburgh, mainly contributed to the foundation of the Literary and Philosophical Society of Liverpool.

In 1839, Mr. Yates drew attention to a subject of great local importance—the rapid changes which take place in the mouth of the Mersey; and noticed the possible difficulties which might hereafter be experienced in the commerce of the port. These had attracted the attention of the marine surveyor and of many ordinary observers, but it was not easy to discover a cure for an admitted evil. At the meeting of the British Association at Liverpool in 1854, Mr. Yates, in a paper read before the Geographical section, again directed attention to the subject, and a committee was appointed to inquire into the whole matter, which has held its sittings in the house of the Royal Geographical Society, and which is still pursuing its labours.

In the pursuits of geographers and travellers he took a deep interest, and he possessed some curious mediæval maps and charts.

In February, 1838, he read a paper on the State of Geographical Knowledge and the Construction of Maps in the Dark Ages, with an account of their revival in the sixteenth century. He was a Fellow of this, of the Antiquarian, and of several other learned Societies.

GEOGRAPHICAL PROGRESS.

The great military events in which the country has been engaged during the past year, and the objects to which the energies of the nation have necessarily been directed, may naturally be supposed to have diverted attention from those pursuits of science which are not of a military character. Although this may be true in some respects, yet much has been accomplished in the branch of science which we cultivate, and but few of the meetings of the Society have passed without some addition to our store of geographical knowledge.

EUROPE.

Great Britain—Ordnance Survey.—The present year will be marked as a great epoch in the history of the geography of our own country. The Trigonometrical Survey, which commenced, in 1784, under General Roy, R.E., has just been brought to a close under Lieut.-Colonel James, R.E., the present zealous superintendent of the Ordnance Survey. The principal object which the Government had in view when the Trigonometrical Survey was commenced, was the determination of the difference of longitude between the observatories of Greenwich and Paris; and for this purpose a base line was measured on Hounslow Heath; from which a series of triangles, including the Observatory of Greenwich as one of the points, was carried to Dover and the opposite coast of France. The French geometricians at the same time extended their operations also to the coast, and the connection between the triangulations of the two kingdoms was made by conjoint simultaneous observations.

This chain of triangles from Hounslow to Dover was then made the basis of the Topographical Survey, which was also in progress at that time under the Master-General of the Ordnance; and from Hounslow as a starting point, the triangulation has been carried over the whole extent of the United Kingdom. Lieut.-Colonel James has recently communicated to the Royal Society the principal results of the Trigonometrical Survey, in a paper 'on the Figure,

Dimensions, and Mean Density of the Earth, as derived from the Ordnance Survey.' In this communication, he states that now that the observed angles have been corrected by the most refined methods of mathematical science, the triangulation is rendered perfectly symmetrical and consistent in itself, so that, any side being taken as a base, the same length will be reproduced when it is calculated through the whole or any part of the triangulation. This, as regards the angular measurements, leaves nothing to be desired; and when the five measured bases are incorporated in the triangulation, although some of them are 400 miles apart, and from 5 to 7 miles in length, the greatest difference between the measured and computed lengths of the bases does not amount to 3 inches; and it may be safely affirmed that such a degree of accuracy was never before attained in so extensive a triangulation.

Astronomical observations have been taken at numerous trigonometrical stations for the purposes of determining their latitudes, and by comparing the amplitudes of the astronomical with the geodetical arcs, the figure and dimensions of the Earth have been determined. In determining the most probable spheroid from all the observed amplitudes, continues this talented officer, it was evident that the plumb-line was deflected from the true direction of the zenith at several points, and that this was the case at the Royal Observatory of Edinburgh and Arthur's Seat near it, to the extent of 27" to the south. The configuration of the ground—the great valley of the Frith of Forth being on the north, and the range of the Pentland Hills on the south—presented a tangible cause for the deflection; but as the contoured plans of this district were published, and Colonel James was himself personally acquainted with the geological structure of the country, he had observations made on the summit and on the north and south flanks of Arthur's Seat, with the view of determining the amount of the attraction of its mass, and from thence deducing the mean specific gravity of the Earth. The computed deflection of the plumb-line due to the configuration of the ground, accounted in great measure for the observed anomaly in the amplitudes of the arcs of the meridian. The longest arc of meridian which has been computed in Great Britain, extends from Dunnose in the Isle of Wight, to Saxaford in the Shetland Islands, and is 10° in length. The Polar diameter of the Earth, as determined by the Ordnance Survey = 7,900 miles; the Equatorial = 7,926; the compression = $\frac{1}{299.33}$; the mean density = 5.316.

These great geodetical operations have now been brought to a

close, and a full detailed account of them is in the press, and will be shortly published. The latitudes and longitudes are now being engraved on the marginal lines of all the first published sheets of the Survey of Great Britain. The progress of the detailed Survey of Scotland and the northern counties of England has frequently been brought to the notice of this Society, and much dissatisfaction has been expressed at the slow progress which has been made. Since 1851, when the Committee of the House of Commons, of which Lord Elcho was chairman, reported upon the subject, the question as to the scale upon which the MS. plans should be drawn may be said to have been under constant discussion; and for two years of this period, the officers engaged in the survey, in consequence of the frequent change of orders and the long period during which they were without any orders whatever, made scarcely any progress at all. Another Committee of the House of Commons has recently reported upon the subject. They had before them, the written opinions of the most able professional and scientific men in the kingdom; and, continues Col. James, it is to be hoped that the recommendations of that Committee will now be finally adopted for the future guidance of the officers on the survey. They are, as nearly as possible, having reference to the difference in the standards of measure in the two countries, conformable to the instructions for the survey of France, viz.—

1. For the *cultivated districts* the original plans are to be drawn on the scale of $\frac{1}{25360}$ of the linear measure of the ground, or 25·334 inches to a mile, which is sensibly the same as one square inch to one acre.

2. The *uncultivated districts* are to be drawn on the scale of 6 inches to a mile, and the 25-inch plans are also to be reduced to this scale, previous to the whole being reduced to the scale of one inch to a mile, to complete the general map of the kingdom on that scale.* The object which the Government now has in view is, to make the National Survey the basis for the valuation and registration of the sales of property, to facilitate the transfer of property, and for all general or local engineering purposes, including the Hydrographical and Geological Surveys, and every purpose for which an accurate, authentic plan or map is required. This gives an importance to the survey which it never before possessed; and with the ample funds which the Government appear disposed to grant, it is expected that

* An arrangement which will, I am sure, be gratifying to our excellent *ci-devant* President, Sir R. Murchison, who so strenuously advocated it in his last Address to this Society.—See Vol. XXIII.

the whole of Scotland will be finished, as well as the north of England, within ten years.

The system of registering the levels by means of horizontal contours, has been for some time generally adopted on the Ordnance Survey, and their great value is now very generally acknowledged. The contours, when reduced to the one-inch scale, form the most perfect basis for the hill-sketching; and the plans now produced are the most perfect in all respects which were ever made. In England, the counties of Lancaster, York, and Durham have been surveyed for the large scales. In Scotland, the shires of Wigton, Kirkcudbright, Edinburgh, Haddington, Linlithgow, Fife, Kinross, Ayr, Dumfries, Peebles, with the Isle of Lewis, have been surveyed. Eight of the above counties have already been published, and the remainder are in course of publication, whilst the survey is now proceeding in Berwick, Lanark, Roxburgh, and Selkirk-shires.

The one-inch general Map proceeds *pari passu* with the surveys on the larger scales.

The whole of Ireland has been published on the 6-inch scale, and the 1-inch map is rapidly progressing, and several of the sheets are published.

While the subject of our Trigonometrical Surveys is under consideration, I may mention, on the authority of Col. James, that the Surveys of our Colonies are proceeding in the following places, under officers of the Royal Engineers, having, in most places, men of the Royal Sappers and Miners under them:—Australia, Tasmania, Ceylon, Mauritius.

Admiralty Surveys.—To a maritime nation like Great Britain, the importance of detailed nautical charts, with ample sailing directions for the guidance of the mariner, is too obvious to render any excuse necessary for entering with some minuteness into the state of the survey of our own shores. A rapid reconnaissance of a coast might have been tolerated half a century ago; but such a survey of any shore, much less of our own shores, cannot now be accepted. The Ordnance large-scale survey, with its almost mathematical exactness (within certain limits), and the labours of the civil engineer, with his accurate lines of levels extending across the island from sea to sea, have shown us that greater accuracy in our coast surveys has become requisite. Hence the necessity, among other considerations, of determining the tide levels with the greatest care in our estuaries and rivers. This has lately

been done by Commander Alldridge, whom I have the pleasure to acknowledge as a pupil of my own, in the river Dee, and in other places; by Mr. E. K. Calver in the Orwell and Tyne; and by Captain Williams in the Fal; while at the same time the progress of the tide wave, marked by the successive times of high water, has been carefully recorded, and the results have been of much assistance to the civil engineer.

England.—I learn from our able and zealous hydrographer, Capt. Washington, R.N., that on the south of England, Lieutenant Cox and Mr. Osborne have mapped the coast from the Bill of Portland westward to Golden Head, including the remarkable shingle beaches of Abbotsbury and the Chesil Bank, and have made a detailed plan of the harbour of Bridport. They have now begun a careful examination of Plymouth Sound, the result of which must be looked forward to with much interest, as it will show what effect the breakwater has had upon that anchorage, during the forty years that have elapsed since the stone of that structure first raised its head above the level of low water.

In Cornwall, Captain G. Williams and Mr. Wells have completed the thirty miles of coast between Fowey and Falmouth, with plans on a large scale of the harbours of Pentuan and Mevagissey, the latter so valuable to our pilchard fishery.

In the Bristol Channel, Commander Alldridge and Mr. D. Hall have produced an excellent plan of the rivers Taw and Torridge, leading up to Barnstaple and Bideford on the north coast of Devon. Their last year's work, namely, the plans of Milford Haven, with Pembroke Reach, on the scales, respectively, of 4 inches and 12 inches to a mile, have been published at the Admiralty.

Farther north the channels and shoals at the entrance of the Solway Firth have been re-examined, and the charts have been corrected for the material changes, which have occurred during the last twenty years, since this Firth was originally surveyed.

A new edition of Part I. of the Channel Pilot, comprising the entrance of the Channel and the coast of England as far as the Downs, has been compiled by Mr. J. W. King, Master R.N., and published at the Admiralty. Part II., which will contain the north coast of France, from Grisnez to Ushant, is well advanced.

Scotland.—The remarkably broken outline and indented shores of the Western Highlands of Scotland, embracing picturesque fiords and lochs, afford constant occupation for a large force of surveyors. Commanders Bedford and Creyke are employed in Argyllshire; and

parts of Jura, of Loch Spelve in Mull, and Loch Feochan, have been mapped during the past season.

More to the north Commander Wood, and Messrs. Jeffery and Taylor, are engaged on the shores of Skye, and have recently examined its northern coast from Loch Sligachan to Kyle Akin and Kyle Rhea. The nautical survey of these coasts, however, can only proceed slowly, as the coast surveyors have to do not alone their own legitimate work, but that of the Ordnance also, as the land survey has not yet reached the Western Highlands and islands of Scotland.

With the exception of part of the isle of Lewis, the Hebrides are yet unsurveyed; but a strong force, under Captain Otter, has again broken ground there, and there is reason to believe that this outlying portion of the realm of Scotland will not much longer remain the opprobrium of our maps and charts.

The Orkneys and Shetland have been revisited, during the past summer, by Mr. E. K. Calver, in order to revise and prepare for immediate publication the sailing directions of those intricate groups. This work has been very satisfactorily executed, and the Directions are now passing through the press.

In the Firth of Forth, Lieutenant Thomas and his assistants have examined the coast of Fife as far as Fifeness; they have filled in the deep-water soundings to the eastward of the isle of May; and if the season prove favourable, they will this year complete the survey of the Firth of Forth as far as St. Abb's Head, its natural southern limit.

Ireland.—Captain Washington, continuing his report, observes, in the county of Antrim, on the north-eastern shore of Ireland, Messrs. Hoskyn, Aird, and Yule have mapped the coast from Carrick-a-Rede southwards to Garron Point, a distance of about 40 miles; they have also connected by soundings Rathlin Island with the Main. The same party is now employed in recording the remarkable improvements that public spirit and good engineering have within the last few years effected in the harbour of Belfast.

On the coast of Donegal Captain Bedford and Lieutenant Horner have completed an elaborate and admirable plan of Lough Swilly, which shows all the striking features of that fine inlet of the sea, which has often proved a harbour of refuge to the toil-worn mariner in the hour of need.

On the south-west coast of Ireland, in the county of Kerry, Commanders Beechey and Edye, with Mr. W. B. Calver, have made a beautiful plan of Castlemaine harbour and bay, and are now ad-

vancing along the northern shore of the peninsula which forms the southern limit of Tralee Bay.

A little farther to the southward, on the same coast, Commander Church and Lieutenant Veitch have mapped the shore of Kerry, from Ballinskelligs Bay to Port Magee, and for the first time laid down correctly and given us the soundings around those striking schistose rocks, the Skelligs, which rise, almost precipitously, to a height of 700 feet above the level of the water, and on which bursts the whole force of the Atlantic ocean swell. This was a labour of no common kind, and required for its accomplishment a combination of skill, seamanship, and persevering energy that falls to the lot of few.*

Baltic.—A time of warfare, at first sight, would not seem favourable to the advancement of hydrographical knowledge, or at least to the more peaceful branches of science, yet, observes Captain Washington, we are enabled to state that at the close of the struggle now happily terminated our acquaintance with the Baltic, and the Gulfs of Finland and Bothnia, is considerably in advance of what it was when the campaign opened; but it is to the Danish, Swedish, and Russian charts of those seas that we owe the fact of our ships being enabled to pass the Kattegat, the Belts, and the Sound without hesitation, and to navigate the inner gulfs of the Baltic without danger. Notwithstanding all the vague assertions to the contrary, it does not admit of a question, that no fleet ever left the shores of Great Britain so well provided with charts as the Baltic fleet. It is but an act of justice to the eminent hydrographers of Denmark, Sweden, Norway, and Russia (with whose charts the fleet was furnished), that their fame should be vindicated. The names of Zahrtmann, Klint, Vibe, and Lütke are of European reputation, and afford ample guarantee for the accuracy of the charts published under their superintendence. That opportunities have since been afforded for making additions to them is only what might

* It is with extreme regret that I have to add that this was the last labour of Commander Church. On his way to Ireland, after depositing his charts at the Admiralty, he was suddenly taken ill at Bristol, and in three days was no more. His worn-out frame, which had toiled for many years under an African sun, and had bravely buffeted with the Atlantic surge while mapping the coasts of Cork and Kerry, sunk under the attack, and thus deprived H.M. service of one of the best of its surveyors. Skilful, energetic, zealous, of unbending integrity, and a thorough seaman, he combined all the qualities of an accomplished surveyor; and so long as the Fastnet Rock and Cape Clear continue to be the landfall of vessels crossing the Atlantic from America, the mariner will have cause to bless the skilful hand that, by accurately defining the dangers of that iron-bound coast, has converted them into friendly landmarks for which the sailor may safely steer.

have been expected. A fleet numbering occasionally 100 sail could not be cruising for two summers in a narrow sea without taking soundings; and it is highly to the credit of the masters of that fleet generally that they availed themselves of every occasion of adding to the charts all the information they obtained. Our special surveyors, Captains Sullivan and Otter, and their assistants, Commanders Cudlip, Creyke, and Burstal, and Lieutenant Ward, R.N., were enabled to make plans of Led Sound in the Åland Isles, and the approaches to Bomarsund; of Barö and Häst Sounds, with the southern access to Sweaborg; of Wormsö Sound on the south side of the Gulf of Finland, with various tracks as far as Torneå and Haparanda, at the head of the Gulf of Bothnia.

It is worthy of special remark that the magnetic variation throughout these seas was found to be sensibly decreasing; indeed such proves to be the case all over the North Sea, the Irish Sea, and the Channel, and probably extends throughout the greater part of Europe; and the mariner cannot be too much on his guard against the amount of variation he finds marked on charts professing to be corrected up to the present year. The westerly variation in the British Isles appears to have reached its maximum in the year 1836, since which time it has been decreasing at an average rate of about six minutes yearly.

Black Sea.—As in the Baltic, so in the Black Sea, our cruisers have added materially to the charts. To Manganari's atlas of that sea, completed in 1836, several details have been added by Captain Spratt, R.N., C.B., and the surveying staff under his directions, Lieutenants Mansell, Wilkinson, and Brooker, who have discovered several rocks, especially near the Strait of Kertch, and off Anápa on the Circassian coast, which had escaped former examinations. They have also sounded around Kinburn Spit and the estuary of the Dnieper and Bug, leading up to the towns of Khersón and Nicolaief, charts of which rivers, on a large scale, have been published. An elaborate and beautiful plan of the Khersonese peninsula, including Kazach and Kamiesh Bays, and showing the position of the Allied camps and batteries, has been completed by Lieutenant Wilkinson, and is a work that does him the highest credit.

Captain Spratt's reconnaissance of the country between Kustenji and the Danube at Chernavoda, a sketch of much interest in the discussion of the various projects, either of a railway or a canal, to unite the Danube and the Black Sea, has just been published, as also his chart of the Narrows of the Dardanelles, which includes the

site of the new hospital at Aren-kieui, in Asia Minor, a few miles from the Plain of Troy.

On the coast of Egypt, Commander Mansell, in the 'Tartarus,' has commenced the examination of the north shore, from the Damietta mouth of the Nile eastwards, with a view to ascertain whether it affords a suitable site for the entrance of a ship-canal, which has been proposed to connect the Mediterranean and Red Sea by the Isthmus of Suez.

South Africa.—The survey of the shores of the Cape Colony advances slowly; yet, notwithstanding the scanty means placed at the disposal of Lieutenants Dayman and Simpson, the officers employed in the survey, they have been enabled to map the coast from Hangklip to Cape Agulhas and the intermediate dangers, on the scale of one inch to a mile, which will be immediately published for the benefit of the mariner. They have also surveyed Algoa Bay and Port Natal. Whatever has been done has been carefully done, and is based on the triangulation carried on by Mr. Maclear, Astronomer at the Cape, from the Observatory as far as Cape Agulhas. Much, however, remains to be effected. Both the land survey of the colony and that of the coasts ought to be pressed forward; every year that they are delayed bars the progress of the settlers, hinders the development of the resources of the district, and is attended with loss to the colonial exchequer.

The Cape Colony has the advantage of possessing a number of accurately fixed points, extending over a surface of more than 400 miles on its western seaboard, and comprising the whole country between Cape Agulhas and the mouth of the Orange River; these were obtained, at the expense of the Home Treasury, in the measurement of an arc of the meridian by Mr. Maclear, her Majesty's astronomer at the Cape of Good Hope; and the only use to which they have yet been put in improving the defective geographic and hydrographic knowledge of this part of the world, has been in the construction of the chart before noticed, of about 70 miles of coast-line between Capes Hangklip and Agulhas, by Lieutenant Dayman of the Royal Navy.

We owe this small contribution to hydrography to a catastrophe which will not soon be forgotten—the loss of H. M. troopship 'Birkenhead' and 656 lives, near Point Danger.

Algoa Bay has been lately surveyed by the same officer on a large scale, but the existing chart of the intermediate line of coast westward to Cape Agulhas is most unsatisfactory. This may be quickly re-

medied, and at small expense, by extending Mr. Maclear's arc of meridian triangles (the last of which terminates near the Breede River) along the coast to Cape Recife, and it is to be hoped that the colony, under the rule of its present enlightened Governor, Sir George Grey, will perform this necessary duty for its own benefit. A surveying vessel might then find ample field for laborious, but highly useful, employment in these seas.

Indian Ocean.—A chart of the Indian Ocean in two sheets has been recently published by the Admiralty, in which the curves of equal variation have been carefully laid down for the year 1855, by Mr. Frederick J. Evans, chief of the Compass Observatory. It forms a valuable contribution to physical geography. A similar chart of the Pacific Ocean is in progress.

Siam.—A tolerably accurate chart of the Gulf of Siam has lately been published by the Admiralty, in which some of the grosser errors of former maps and charts are corrected. It is still, however, very imperfect; but Messrs. Richards and Inskip, surveying officers on the China station, have been despatched to Siam; and there seems ground for hope, not only from their labours, but from the facilities offered by the present enlightened King of that country, that in the course of the present year the chart of the Gulf will be rendered sufficiently accurate for all the common purposes of navigation.

Japan.—The accidents of the late war have led to a slight improvement in our acquaintance with the coasts of the islands of Nippon and Yesso, and especially as to the Strait of Matsumae, or Tsugar (hitherto improperly named Sangar in all our maps and charts), which lies between them. This Strait has been examined by Mr. Richards, as well as a portion of the west coast of Nippon, which proves to be laid down in all our charts some 10 miles to the eastward of its true position.

Tartary.—Farther north, in the Gulf of Tartary—a quarter not visited by any ship of war since Broughton, in 1797—our cruisers have, during the last year, partially traced the western shore of the island of Saghalin, where coal *in situ* and fallen timber, from the wooded land above, are to be found in abundance along the shores. They have examined Castries Bay on the mainland, and traced a deep-water channel, carrying 3 fathoms throughout, towards, but not into the mouth of the Amúr. Farther to the south-west, in the parallel of 43° N., bays, harbours, and gulfs, which have received the names of Victoria, Eugénie, Napoléon, and D'Anville, have been explored and surveyed by the officers of the Allied squadrons, and

especially by MM. Bouchez, Hill, Wilder, Johnson, and May, who have completed a chart which is highly creditable to these young officers. Some useful information has also been obtained respecting the great river Amúr, and of the harbour of Aian and other points in the Sea of Okhotsk.

China.—A slight break has been made in our ignorance of the Gulfs of Pecheli and Leotung, by the visit of Captain Edward Vansittart, R.N., who, in H. M. S. 'Bittern,' chased a fleet of Chinese pirates to the head of the Gulf, where the greater part of them were destroyed. In this dashing affair he boldly took his ship into waters hitherto unexplored, obtained numerous soundings, and corrected approximatively the outline of the eastern shore of the Gulf.

The chart of the island of Paláwan and its off-lying reefs, the result of the elaborate survey of Commander Bate, in the 'Royalist,' between the years 1851-5, has just been published at the Admiralty, accompanied by full sailing-directions. We understand that this skilful officer has returned to China to take command of a ship; may we hope that he will be employed on some service better adapted to his abilities than the usual routine of cruising or carrying despatches. There is "ample room and verge enough" in that region for the labours of several surveyors; large tracts of coast are yet unexplored, and dangerous reefs yet unexamined; and of this latter class perhaps none calling more loudly for immediate examination and marking, both by beacons by day and a light by night, than the extensive coral lagoon-reef of the *Pratas*, barely rising above the level of the sea, lying only 60 leagues to the E.S.E. of our own colony at Hong Kong, and directly bordering on the track of vessels approaching Canton in that direction, either by Dampier Strait or the Gillolo Passage.

New Zealand.—A general chart of this group, comprising the whole of the recent surveys under Captains Stokes and Drury, on the scale of $\frac{1}{16}$ of an inch to a mile, or $\frac{1}{160000}$ of the natural scale, has recently been published at the Admiralty, together with plans of Cook Strait and Port Nicholson, which are important features of the group, as they include the settlements of Wellington and Nelson. The whole is accompanied by a complete set of sailing-directions, compiled by Captain George Richards and Mr. F. J. Evans, R.N. (both assistants on the survey), from the various Admiralty surveys which have been carried on since the year 1848, and are now brought to a close by the return to England of the 'Pandora,' Commander Drury, who brings away with him gratifying

testimonials from the colony as to the value of his services in those regions, increased by the promptitude with which he made them available to the navigator, by furnishing accurate accounts of the result of his surveys through the medium of the 'New Zealand Gazette.'

Pacific Ocean.—Capt. Denham still pursues his useful labours in the Western Pacific. Within the past year he has surveyed and fixed the position of Norfolk Island, to which place much interest attaches in consequence of some of the Pitcairn islanders being in course of removal to that spot, as their future dwelling. He has determined the position of Conway Reef, an extensive sandbank only 6 feet above the level of high water, and has planted cocoanuts upon it, with a view to render it more conspicuous hereafter, a practice which all navigators will do well to follow for the general benefit of the mariner. On his route to the Fiji Islands, Capt. Denham obtained soundings and brought up bottom from a depth of 1020 fathoms, containing thirty distinct genera of *foraminifera*, most of which belong to existing forms in the Pacific, though only traceable as fossils in the northern hemisphere. Plans of Levuka harbour and island and of the Embau waters in the Fiji group complete his work for the past season.

Farther to the east, in the North Pacific, Fanning Island has been visited by Capt. Morshead, and its true position found to be in lat. $3^{\circ} 49' N.$, long. $159^{\circ} 19'$, or 32 miles to the westward of that usually assigned to it in our charts.

Nova Scotia.—Plans of Halifax harbour and of the coast to the eastward as far as Shut-in-Island, resulting from the surveys of Capt. Bayfield and his party, have been published at the Admiralty during the past year on the respective scales of three inches and one inch to a mile. Their recent labours during the past season have comprised a detailed survey of the coast and harbours from Cape Canso westward to Country Harbour—a laborious and very creditable work.

In the Bay of Fundy, Commander Shortland has completed the survey of the Grand Manan islands at the entrance of the Bay, and a portion of the south-western coast of Nova Scotia. Both the above-named officers are now lending their aid and pointing out the best track for laying the submarine cable that is to connect Cape Ray, the south-west point of Newfoundland, with the island of Cape Breton, a strait only 60 miles in width with a depth of about 200 fathoms. When this connexion is made, there will, we believe, be uninterrupted communication by electric telegraph from New Orleans

on the Mississippi to St. John's, Newfoundland, a distance of about 2000 miles.

West Indies.—A plan of Port Escocés and Caledonia harbour, surveyed by Messrs. Parsons and Dillon, has been published by the Admiralty during the past year. These officers have recently been engaged in the examination of the islands of Santa Cruz and St. Lucia, the former of which is finished and the latter far advanced.

South America.—On the coast of Brazil the dangerous shoal known by the Portuguese name of *As Roccas*, lying about 120 miles west of Tristan d'Acunha, has been visited by Lieut. Parish, in H.M.S. 'Sharpshooter,' and, at the suggestion of the British Consul at Pernambuco, cocoa-nuts have been planted in the sand, with the hope that at no distant day they may by their growth serve to warn the mariner of his approach to a danger on which doubtless many a vessel has met its fate.

Rio de la Plata.—In this river, above Buenos Ayres, Lieut. Sidney, with slight means at his command, has re-examined the approach to the river Paraná, and re-sounded the shoals in the vicinity of Martin Garcia. The whole of this vast estuary requires a careful survey. During the past year a sketch-chart of the river Paraguay from Corrientes upwards to Asuncion, by Lieut. Day, R.N., on the scale of one inch to a mile, has been published by the Admiralty; and, on a much smaller scale, the upper part of the river as high as Coimbra, from Portuguese authorities.

In the Falkland Islands a plan of Port Egmont, one of the many safe harbours in that group, surveyed by Capt. Sullivan, C.B., in 1849, has recently been published on a large scale, and may prove useful to the numerous whalers and other vessels which occasionally resort to those islands.

France.—I learn from my zealous and intelligent correspondent, Mr. J. B. Pentland, that the Dépôt Général de la Guerre has continued the publication of its great Map of France, 9 sheets of which have been published during the past year. This magnificent work will consist of 258 sheets, of which 175 have been already engraved. The geodesic operations of this work being concluded, it is proposed to determine astronomically the longitudes or meridian distances of the several trigonometrical stations by means of the electric telegraph; a body of officers appointed for that purpose, under Commandant Roget, are now engaged in the preliminary researches at the Imperial Observatory of Paris.

The beautiful survey, by the officers of the French Etat-Major, of the environs of Rome has been completed, but only one sheet has as yet been published; the remaining ones will, however, shortly be in the hands of the public.

French Maritime Surveys.—The maritime surveyors of France have conducted their surveys along the coasts of Italy and of the Strait of Gibraltar. M. Darondeau has completed the remainder of the survey of Western Liguria; and the whole coast of Italy may now, be said to be completed from the Var to the mouths of the Tiber, and is in course of publication. M. Darondeau is now occupied in conducting operations in the Neapolitan dominions, and has already connected the islands of the Ponza group, with his triangulation of the continent.

The hydrographic expedition despatched by the French Government to survey the Strait of Gibraltar and the adjoining coasts of Morocco and Spain, has most satisfactorily completed its laborious task, thanks to the zeal of Captain Kerhallet, well known by his works on the Currents of the Atlantic and Pacific Oceans, and of M. Vincendon Dumoulin, one of the most eminent of the corps of Ingénieurs Hydrographes of France. The survey, based on an accurate triangulation, extends from Cape St. Lucar on one side, and Cape Spartel on the other, to Gibraltar, and on the northern coast of Morocco as far east as the Zafarina Islands. This excellent survey, I am told, is now in the hands of the engravers. The most important results of the operations of MM. Kerhallet and Dumoulin are the discovery of several new shoals off the Spanish coast; of an extensive rocky plateau, from 15 to 18 miles in length, off Cape Trafalgar; and the correction of various dangerous reefs between Cape Trafalgar and Cadiz. But by no means the least important part of this survey, is the determination of the depth of the Strait of Gibraltar, in olden times supposed to be unfathomable, and continued so until the assumption was dispelled by our able Mediterranean surveyor, Admiral Smyth. The depth of this Strait has been considerably overrated in the Spanish and English surveys, as it has been found in many parts to average from 380 to 490 fathoms only; the greatest depth being 503 fathoms (1010 mètres) about mid-channel, at one mile east of the line extending from Europa Point to Almina, at Ceuta. Numerous observations were made on the set of the currents in the Strait and on the temperature of the sea at different depths, which dispel the belief in an undercurrent setting out of the Strait. We must acknowledge with gratitude to MM. Kerhallet and Vincendon Dumoulin this great addition to our store of improved hydrography and physical geography.

In the catalogue published by the Dépôt de la Marine will be found many new charts of great interest and importance; amongst others, surveys of the French establishments on the coasts of New Caledonia.

Spain.—The Spanish Government has caused a survey of that kingdom to be commenced upon an uniform system, and a part of the preliminary triangulation has been completed. A series of triangles, in a meridional direction, has been carried on from Pico, E. of Malaga, on the coast of the Mediterranean, to Santander, on the Bay of Biscay, and on the direction of the parallels from the Portuguese frontier to Aragon, where it has been connected with the operations of MM. Biot and Arago for the measure of the arc of the meridian between Dunkirk and Formentera. An important addition to Spanish geography has appeared in a work entitled '*Atlas de España y sus Posesiones Ultramar,*' of which 25 sheets have already been published, constructed by our much-esteemed Corresponding member, Colonel Coello. These comprise Cuba, Porto Rico, the Philippine, Marian, and Balearic Isles, the Canaries, African possessions, and part of her continental provinces. In addition to these separate maps of the departments of Spain and of her foreign possessions, the Atlas contains enlarged plans of the principal cities and towns, and notices of the statistics, administration, and history of each division, contributed by another of our distinguished Corresponding members, occupying an eminent position as both statesman and geographer, Don Pascual de Madoz.

M. de Verneuil, the eminent French geologist, whose name has often been alluded to by my predecessors, has continued, during the past year, his geological survey of Spain and his barometric levellings. His late researches have extended over the desolate province of La Mancha, where he has fixed the height above the sea of several hundred points.

Italy.—The Piedmontese Government has continued the publication of the map of its continental possessions, on a scale of $\frac{1}{50,000}$, and it is expected that the whole will be completed next year.

The Abbé-Poncet has published the number of 360 measured heights in Northern Savoy—an interesting addition to those already given by De Candolle and Professors Chaix and Favre. Mr. Borson has contributed an extract of the geometrical measurements of the Sardinian Staff, which adds the positions and heights of sixty more places to the above.

The Austrian Geographical Institute of Vienna has given the public the last sheets of its great Map of Central Italy, alluded to in previous Addresses of the Presidents of this Society. The map is now accompanied by statistical data of considerable interest concerning Tuscany and the Papal States, and the work, as a whole, is a most useful and important contribution to geographical science.

As to Naples, I am not aware that any progress has been made in the publication of the survey commenced by the late General Visconti, often alluded to by my predecessors.

Switzerland.—From our Corresponding member, M. J. Ziegler, we learn that the geodetical and topographical operations of Switzerland have been continued in the north of the Canton of Tessin and in the chain of the Alps, crossed by the passes of Lukmanier, of Bernhardin, and Splügen. The principal labours which have been executed in the past season were commenced chiefly in a geological point of view, such as that by Dr. Heusser in Valais, which was undertaken in order to make some observations in the environs of Visp, the centre of commotion of the destructive earthquakes which, even to this day, make themselves felt.

Professor Heusser, of the University of Zürich, has visited these places, and has given the results of his personal observations in a little work which the Society of Natural History at Zürich has published. M. Riou has published an account of the earthquakes which were felt in 1855, in the months of July and November. Meteorological observations have also been made during the past winter throughout the whole extent of the central Alps.

By the uninterrupted railway works throughout Switzerland the number of hypsometrical data is increasing, and the interest in hypsometry is becoming greater. Hypsometrical charts are more numerous, and the use of them is becoming general in proportion as we can compare with exactitude the elevation of different countries. I may particularly allude to Mr. Ziegler's Hypsometrical Atlas, in course of publication.

Our learned Associate, Professor Chaix, of Geneva, informs us of the expected return of Messrs. H. de Saussure and H. Peyrot from their journey to Mexico, and that Professor De Candolle has published, in two volumes, a comprehensive treatise on Botanical Geography. From the same high authority our Secretary has just received an interesting communication on the Hydrography of the

Valley of the Arve, which will be laid before the Society at an early period.

Norway.—Our Associate, Professor Munch, of Christiania, has enriched our collection with several recent maps and charts of the Coast Survey of Northern Norway, forming a series, beginning about the 64th parallel and extending to the Russian frontier.

The Coast Survey Charts of Southern Norway have also been received, as well as Professor Munch's Map of Southern Norway, Northern Norway with Finmarken, 1852, and Norway, published at Christiania in 1854; also the Amt Maps, by Captains Ramm and Murthe.

Major Vibe, of the Norwegian Engineers, informs our Secretary that, in addition to the Coast Surveys already mentioned as having been lately published, others, by Munch, Giessing, &c., are in course of preparation.

Denmark.—The Royal Society of Northern Antiquaries has just held its anniversary meeting at the Palace of Christiansborg; its President, Frederick the Seventh, King of Denmark, in the chair. Prof. Ch. Rafn, our Associate, communicated an account of the proceedings of the Society during the past year, and exhibited the new volume of the 'Annales' of Northern Archæology and History; the new number of the Society's Review, and of the 'Mémoires des Antiquaires du Nord.' He also laid before the Society the second part of the 'Lexicon Poëticum' of the Icelandic language, compiled by Sveinjörn. Among the articles in the 'Annales' may be especially noticed 'King Oswald hin Helligés (the holy) Saga,' with a preface by Jon Sigurdsson, and translations by Thorl. G. Repp; also a notice on Virdaland's Ancient History, by Prof. A. Cronholm, of Lund; and a Grammar of the Faeröe Language, by the Rev. V. U. Hammershaimb, of North Stræamey. In the Antiquarian 'Tidsskrift' are found papers on the *Old-English* and *Old-Norsk*, by Gisle Brynjulfsson; on the Ancient Languages of the North, by G. E. Lund; *Old-Norsk* Remains among the Orkneys, by G. Petrie, Esq., of Kirkwall; Antiquarian Contributions from Slavie Lands and Monuments of the Bosphorus, by Edwin M. Thorson; Report on the Cabinet of American Antiquities, by Ch. Rafn. In the number just published of the 'Mémoires' are papers on Runic Inscriptions in Sodor and Man, with a Geographical elucidation of the Irish and Scotch names occurring in the Sagas, by

P. A. Munch. The Saga of St. Edward the King, with an Introduction by Rafn and Sigurdsson; Remarks on a Danish Runic Stone from the *Eleventh* Century, lately discovered in the centre of London, with Runic inscriptions, alluding to the Western Countries, by Rafn; and, finally, one by Brynjulfsson, entitled 'De l'Ancien Roman François et de l'Influence exercée sur son Développement par les Normands.' The King communicated to the Meeting the results of the researches which he had carried out among the ancient royal sepulchres at the Cathedral at Ringsted in Seeland; upon which the Vice-President, C. F. Wegener, read a Memoir on the Tombs of King Waldemar the Great, and his Queen Sophia, daughter of Valodimir of Russia. The Secretary read a statement of the progress made during the last year in deciphering the Runic inscriptions so numerous in Scandinavia,—an account of which he is preparing for publication.

Portugal.—We have received, through the polite attention of Count Lavradio, several numbers of a periodical, published by the Portuguese Government, entitled 'Boletim e Annaes do Conselho Ultramarino,' which contains rich contributions to African geography.

Germany.—It is with great pleasure I have to notice the establishment of a Geographical Society at Vienna.

We continue to receive Herr Gumprecht's valuable 'Geographical Journal,' containing the proceedings of the Berlin Geographical Society, in addition to other material.

Hungary.—The ethnographical studies, by M. Valerio, of the various races forming the population of Hungary, have been published, with numerous illustrations.

Greece.—A work on the Peloponnesus, by M. Beulé, appears to form an excellent guide to the Morea, and is worthy of being translated.

ARCTIC.

At the opening of the Address of last year by my noble predecessor, the return of Dr. Rae was announced, bearing with him evidence of the fate of the long missing expedition under the lamented Sir John Franklin; and I have now to notice amongst the papers read at the meetings of the Society, the expedition consequent upon the information furnished by him. You will remember that Mr. Anderson, who conducted this expedition, pursued his route down the river Back,

bearing testimony to the great accuracy with which the distinguished navigator, from whom it derives its name, had described and laid down the features of that dangerous river. Among much valuable information which Mr. Anderson collected, will be found the deeply interesting fact of his having discovered upon Montreal Island the remains of a boat, upon part of which was cut the word 'Terror,' and upon the frame of a snow shoe the name of 'Stanley,' the surgeon of the 'Erebus,' leaving no doubt as to the fate of those unfortunate vessels, viz. that they had either been wrecked or inextricably fixed and abandoned; and confirming in all essential particulars the information brought home by Dr. Rae.* The great interest which attaches to this journey of Mr. Anderson, intimately connected as it is with the fate of our countrymen, the sufferings and privations endured by himself and his party, will render this volume of our Journal of deep and general interest.

Scarcely had the breath of novelty passed over this sad but too certain history, when the announcement of the return of our medallist, Dr. Kane, completed the page of past adventure in search of our missing countrymen. The important discoveries of this gallant officer consist of an elongation of Smith Sound to a higher northern latitude than that of any other known land in the Arctic regions, and to a higher parallel than had ever been reached by any navigator, except Parry; and of the discovery of a vast ocean beyond, apparently free from ice, with which it communicated. The patient endurance under hardship, sickness, and privation, the zeal displayed in the execution of this arduous service, and important discoveries in those inhospitable regions, have earned for Dr. Kane the unqualified approbation of this country; and the highest honour this Society has to bestow, has been awarded to him; while the modesty with which he has related his perilous adventures, and the merit he bestows upon all his party, will place his narrative amongst the most fascinating papers in our Journal.

Contemporaneously with the notice of Dr. Kane we announced the return of Commodore Rogers of the United States Navy from the seas to the northward of Behring Strait. He records having ascended Herald Island, from which he could see no land whatever; and having sailed over Plover Island, which he removes from the chart; as also the islands reported to have been seen to the north of

* Dr. Rae and his companions have now received the award of 10,000*l.* offered by the Admiralty for the first clue to the remains of the expedition.

Cape Yakan. He discovered a vast barrier of ice on the north, so solid as to lead him to declare that no keel has ever divided those waters.

During the last year our indefatigable Captain Collinson has returned to our shores from Behring Strait, rich in Arctic enterprise, and enjoying the distinguished honour of having, by skill, energy, and patient endurance, brought his vessel, the 'Enterprise,' safely back from her perilous adventures, and returned her to the shores, whence he departed with her; an act which should not be overlooked in the catalogue of the meritorious deeds of that highly scientific navigator. About the same period appeared 'The Last of the Arctic Voyages,' by our associate, Sir Edward Belcher; in which he gives an account of his proceedings, and of the many land and boat journeys undertaken by himself and officers under his command; completing, through their instrumentality, the northern coast of the Parry group, and adding Victoria Land and other geographical features to the cartography of those regions. Then, as if to swell the mention of Arctic enterprise, at this time appeared a reprint, by the Hakluyt Society, of the quaint but interesting documents of old voyages; and also a voluminous summary, entitled 'Scoperte Artiche,' compiled for the enlightenment of the Italians, by Conte Francisco M. Erizzo. Lastly, I have to notice among the events of the past year, as connected with Arctic enterprise, the bestowal of the honour of knighthood upon Sir Robert McClure (our medallist), the gallant officer who virtually accomplished the North-West passage—a justly-merited tribute of the nation, and a token of the high sense it entertains of the worthy deeds of those navigators who had so laboriously pursued their perilous researches in those ice-encumbered seas.*

At this period of Arctic discovery it will perhaps be expected that I should offer some remarks upon the results and the benefits which have been derived from it by the country.

It is now nearly forty years since the revival of our Polar voyages, during which period they have been prosecuted with more or less success, until, at length, the great problem has been solved. Besides this grand solution of the question, these voyages have in various ways been beneficial; and Science at least has reaped her harvest. They have brought us acquainted with a portion of the globe before

* The sum of 10,000*l.* was also voted to him and his gallant companions by the House of Commons.

unknown. They have acquired for us a vast addition to our store of knowledge—in magnetism, so important an element in the safe conduct of our ships; in meteorology; in geography, natural and physical; and which has led to the prosecution of like discoveries in the regions of the Antarctic Pole. They have shown us what the human frame is capable of undergoing and of accomplishing under great severity of climate and privation. They have opened out various sources of curious inquiry as to the existence at some remote period of tropical plants and tropical animals in those now icy regions, and of other matters interesting and useful to man. They have, in short, expunged the blot of obscurity which would otherwise have hung over and disfigured the page of the history of this enlightened age; and, if we except the lamentable fate which befel the expedition under Sir John Franklin, we shall find that they have been attended with as little if not less average loss of life than that of the ordinary course of mankind. And if any one should be disposed to weigh their advantages in the scale of pecuniary profit, they will find that there also they have yielded fruit, if *not to us*, at least to a *sister nation* in whose welfare we are greatly interested, and whose generous sympathy in the fate of our countrymen endears her to us, and would render it impossible that we should begrudge her this portion of the advantage of our labours. I need hardly remind you of the Report from the Secretary of the United States Navy to the Senate, to the effect that in consequence of information derived from one of our Arctic expeditions to Behring Strait, a trade had sprung up in America by the capture of whales to the north of that Strait, of more value to the States, than all their commerce with what is called the East! and that in two years, there had been added to the national wealth of America, from this source alone, more than eight millions of dollars.

AFRICA.

I would next direct your attention to a region widely different in its physical character to the last, but one in which we have alike pushed our discoveries, with slow and occasionally painful progress, it is true, but upon the whole with steady success—the region of Africa. It is from this country I have to congratulate the Society on the safe return of that distinguished traveller Dr. Barth, the successful explorer of a large portion of Central Africa, and of the famed city of Timbuctú. An account of this expedition is now preparing by Dr. Barth for publication, in five volumes, with maps;

and, from the extent of the work and the care bestowed upon it, we may expect to derive an enlarged knowledge of the country through which he passed.

From letters communicated by the Foreign Office, we learn that Dr. Vogel was at Gujeba in January last, and had thence proceeded to Yakoba. His last letter is from Gombé. It appears that, in attempting to reach Adamaua, he had crossed the Binué, at a point where the steamer under Dr. Baikie had stopped, and that he there left letters in expectation that another steamer would be despatched up the Chadda. We learn with regret from Dr. Vogel that his health had suffered, but, on the other hand, we have cause to be thankful that his life had been saved through an accident, which prevented his joining a party of fifty persons going to Yola, all of whom, except two, were murdered the same day.

Our associate, Dr. Baikie, has recently published an interesting and instructive description of the voyage of the 'Pleiad' steamer up the Niger and Chadda, including a map from the original survey by Mr. May, R.N., and much general information respecting the nations and countries of that important part of Africa. In the mention of this work, which reflects credit upon its author, I must not omit to notice an oversight which I am sure Dr. Baikie will, with his usual candour, acknowledge. In alluding to the origin of the Expedition, Dr. Baikie does not mention the persevering part taken by the Council of this Society, and particularly by Sir Roderick Murchison, in promoting it; and he has entirely omitted to connect the name of M'Leod with the great and novel feature of the plan which rendered this Expedition so successful in all respects, and will govern the operations, in regard to season, of all future expeditions. It will be seen in our Journal that, early in 1852, a project for ascending the Niger *with the rising waters*, was laid before the Council by Lieut. Lyons M'Leod, who had been employed for some years on the African coast. Having been referred to the Expedition Committee, attention was directed to a clause in Mr. Laird's mail contract with the Admiralty, which provided for the ascent of one of the African rivers, by steam, at a small expense; and the Committee recommended Lieut. M'Leod to communicate with Mr. Laird and adapt his plan to this arrangement. Other steps were also taken and communicated to the Society by Sir Roderick Murchison, in his Presidential Address of that year. In 1853 the Expedition having been brought under the notice of the Government by Sir Roderick, as President of the Society, some progress

was made, but a change in the Cabinet caused delay; and in the mean time the arrival of Dr. Barth on the banks of the Upper Chadda, directed attention to that branch of the Niger, and turned the proposed course of the Expedition towards it. The plan received the warmest encouragement from Lord Clarendon, but the favourable season being past, it was necessary to defer proceedings till the ensuing year. These circumstances were also laid before the Society in the Presidential Address for 1853. In 1854 the Expedition started, and it was intended that the veteran African explorer, our late member, Mr. Consul Beecroft, then residing at Fernando Po, should take the command; but his lamented decease having occurred a few days before the arrival of the party from England, the command devolved upon Dr. Baikie, with whom Mr. May, of her Majesty's ship 'Crane,' was associated as surveyor, through the kindness of Captain Miller, R.N., F.R.G.S., then chief officer on the station.

I have felt it to be due to the persevering efforts of this Society in promoting this Expedition, and to the individuals whose names are so honourably connected with it, to insert in some detail these facts connected with its origin; of which, I am sure, Dr. Baikie will acknowledge the justice and propriety.

The spirit of adventure is again revived: Dr. Baikie, the successful explorer of the Chadda, has offered his services to conduct an expedition up the Niger, and, leaving a trading party at Rabba, to pursue his route thence by land to Sokatú, the residence of the Sultan, whose influence is said to be so great, that could it only be obtained, an impulse would be given to commerce, and slavery would be annihilated.

A communication from Governor O'Connor, describing a visit to the Island of Bulama, in the Bisagos group, and a voyage up the river Casamance, informs us of the present condition of those places, and the state of the settlements there.

Captain Skene, R.N., of the 'Philomel,' is about to return from the West Coast, where he has ascended the Bonny, the Congo, and the river of Lagos, and from whose journals we may expect some interesting information.

We learn that Commander Lynch, of the United States Navy, has examined a large part of the coast of Liberia, and several of its rivers, as a preliminary to an exploration of the interior. Sickness, however, obliged him to discontinue his labours.*

* Of the death of Dr. Schönlein, at Cape Palmas, mention has already been

We may mention here that M. Raffenel has at length published an account of his failure to penetrate to the interior of Africa from the French settlements on the Senegal.

Comte d'Escayrac de Lauture has presented the Society with a copy of his Memoir on Soudan, accompanied by a map, in which the positions of the principal towns and the courses of the rivers in Central Africa are discussed with great ability and research, and the habits of the people are also described. The Count has just proposed to attempt, with the assistance of the Egyptian Government, the ascent of the Nile to its sources.

The enterprising Sardinian trader, M. Brun-Rollet, whose establishment on the White Nile was mentioned in my noble predecessor's last Address, having returned to his outpost of exploration and commerce in that region, has since penetrated for a considerable distance along the Misselad; and we are indebted to our Corresponding member, M. le Chev. Negri, of Turin, for the following account of M. Brun's proceedings, dated from the banks of the Misselad, Feb. 1, 1856:—

“After a month's research M. Brun-Rollet came to reconnoitre the lake, by which the waters of the Misselad and of the Modj or Lút communicate with the Bahr el Abiad. He found it about 50 leagues in length from north to south, and discovered the entrance of the Misselad into the lake. He entered the Misselad with three boats (barques), and an escort of 23 soldiers, obtained from an Egyptian post recently established at the confluence of the Sanbat, in the Bahr el Abiad; and the intrepid traveller had already ascended the river for nearly 40 leagues, with the determination to push his exploration as far as possible. The Misselad appears to be so large and deep that M. Brun-Rollet, who has previously visited the Blue Nile, or Bahr el Azrek, as well as the White Nile, or Bahr el Abiad, declares *that he has no doubt of the Misselad being the true Nile*. It appears that during the rainy season this river inundates an immense extent of country. The vegetation of this region is magnificent, and the reception offered by the inhabitants, although not always favourable, had not been hostile. M. Brun-Rollet and his companions, among whom is Madame Brun-Rollet, a young Marseillaise, continued to enjoy excellent health.”

made in the Third number of the Proceedings of the Society; and it is with much regret that I now hear of the decease of a young French explorer, M. Couturier, which took place at Brezina, an oasis in the Sahara, where he had stopped some time in order to acquire a knowledge of some of the native dialects.

From the Eastern Coast we have received, through the Church Missionary Society, an interesting communication from the Rev. J. Erhardt, informing us concerning a large inland sea, long known to exist, and now stated to extend over nearly ten degrees of latitude and four degrees of longitude, with a description of several routes by which different portions of this sea are visited by parties from Mombas, Tanga, Mbomaji, Kiloa, and other towns upon the sea-coast, affording facilities for discovery in that quarter, which the Council have not neglected.

Lower down, upon this coast, we have received information of the return of a party of Moors from the Western Coast of Africa. The 24th volume of our Journal contains an account of a journey performed by a party of Moorish traders from Zanzibar to Benguela, on the West Coast. This is the same party whose arrival we have just announced. It appears that they left Benguela on the 9th June, 1853, and arrived at Mozambique on the 12th November, 1854, crossing large rivers and passing many thickly-inhabited towns in their way; but they do not afford us any means of determining the positions of these places.

I must not conclude these brief remarks upon this continent without calling your attention to the limited extent of our knowledge of that portion of it known as Equatorial Africa. This extensive region, occupying nearly twenty degrees of latitude, and extending from coast to coast, with the exception of the fringe of the shore on either side and the limited discoveries up the Bahr el Abiad, still remains to us almost a "terra incognita." As before observed, we have pushed our expeditions from time to time over its borders, on the north and south and on the east and west, but with sufficient success only to ascertain the general feature of the country in those directions, and to inform us in what quarter we may with the greater advantage direct our future movements. Equatorial Africa really lies still unexplored, and yet, by information from various sources, it seems to present a fruitful field to travellers. The thickly-inhabited towns and large rivers mentioned by the Arabs—the vast inland sea of Niassa mentioned by Erhardt—alone would immortalize the discoverer who should undertake the task; while the existence of mines of copper and other precious metals in that direction, if true, would bid fair to repay the toil.

The source of the Nile, yet undiscovered, lies mysteriously hidden in this vast unexplored region, and, with Niassa, asks who shall unlock its mysteries? We trust that this question will not long

remain unanswered, nor this vast inland region continue almost a blank upon our maps. There are not wanting, in this and other countries, men both willing and able to undertake the task. The gallant Commander of the expedition from Zayla to Harar, Captain Burton, has volunteered to proceed from Zanzibar inland towards the famed Sea of Niassa, and, after exploring its locality, to turn northward towards the Bahr el Abiad; and I will here mention that the Council are now in communication with the Foreign Office and the East India Company, on the subject of the means for sending out an expedition in this direction, a deputation having already had interviews with the Earl of Clarendon.

In Southern Africa, our medallist, Dr. Livingston, is still prosecuting his indefatigable researches. At the last Anniversary, we learnt that he reached Loanda in an exhausted condition, labouring under the effect of fever. His journey thither will be found most interesting, and will well repay the perusal. He then announced his intention of returning to the interior, and of visiting the great chief Muata ya Nvo, or Matiamvo, and of ultimately descending the Leeambye to Quilimane, on the east coast of Africa. By a letter from him at Cassangé, we learn that he had so far carried out the first portion of his plan; but from other sources we are informed that he left Cassangé in February last, crossed the Quango, and pushed on for a trading station, named Cobango, on the river Chihombo, with a view of carrying out his before-mentioned intention of putting himself in communication with Matiamvo. On reaching this place his health was found to have suffered much, from having slept several nights upon a vast plain entirely covered with water; and he was compelled to abandon his intention of visiting Matiamvo, and obliged to strike off southward towards the country of his companions, which he appears to have reached in safety, and in excellent health. Dr. Livingston's observations have been communicated to the Society by Mr. Maclear, the astronomer at the Cape, by whom they have been recalculated and found to be of the most satisfactory character—a feature, in the qualification of a traveller, of the first moment, and which this Society will do well to encourage.

In connection with discovery in the south-east part of Africa, Mr. Moffat, the father-in-law of Dr. Livingston, anxious to learn his fate and to forward supplies for him, had proceeded to Moselekatse's country, the full accounts of which interesting visit have been kindly forwarded to us, by the London Missionary Society, and will be printed in the Journal.

On the South-West, Mr. Hahn, the Rhenish missionary, had left Cape Town for Walfisch Bay, for the purpose of proceeding thence overland to Mossamedes. It was the intention of Mr. Hahn to settle near the mouth of the river Nourse, or Cunené, north of the Ovampo Country, and thence to make expeditions inland along its course. This river appears to be the shortest and most healthy road to this part of the interior.

That persevering and hardy explorer, Mr. Charles John Andersson, to whom the Council adjudged, last year, one of the Royal awards for his journey to Lake Ngami, has published an excellent account of his labours in South Africa, with a map, and many striking illustrations. Mr. Andersson has again started to renew his pursuit of African enterprise, and he also intends directing his attention to the Cunené River.

Lastly, I have to mention M. Lesseps' very interesting pamphlet and map of the Isthmus of Suez, showing the line of a canal which it is proposed to make between the Mediterranean and the Red Sea.

The importance of a ship canal from the Mediterranean to the Red Sea cannot be overrated in a commercial point of view, and especially to this country, when considered in connection with its Indian possessions and colonies. M. Lesseps has shown its importance in other respects, by opening out fresh sources of trade along the shores of the Red Sea itself, and otherwise; and we can only hope that the project, if undertaken, will realize the expectations it has created. The map is a good specimen of chromolithography.

If to these prospects, we add results which may be expected from our indefatigable Associate, Dr. Sutherland, who is a resident at Natal; and from the projected expedition of the United States, *vid* Liberia on the west—from the continuation of Livingston's labours in the south—from the appointment of Mr. McLeod as consul at Mozambique, and from the encouragement offered by the French Geographical Society in the shape of rewards for discoveries in Africa—we may hope to see discovery pushed forward in that continent with vigour; and posterity may possibly witness the resources of this vast continent, brought under the influence of European civilization, its geography known, and its inhabitants emerge from barbarism and slavery.

ASIA.

India.—By far the most important work in this quarter of the globe that has been laid before the Council in the past session, is that of

the Trigonometrical Survey of a large portion of India, by Lieut.-Colonel Waugh, the Surveyor-General of India.

This work consists of geodetical operations of the highest order, carried on through countries for the most part unexplored, and, until lately, inaccessible to Europeans, or, in the words of the Society's motto, "*Terræ Reclusæ*."

The first series of this important work is mentioned by my noble predecessor in his Address, as extending from the Seronj base to Karachi; and I gather from a paper laid before the Council by our Vice-President, Colonel Sykes, that the second series of operations branches off to the north-west, from the great meridional arc at Banog and Amsot, through the plains of the Punjab, and along the southern face of the Sub-Himalaya ranges to Attock and to Peshawur. At Attock, a base of verification was measured. This series extends over seven degrees of longitude, and over a space of more than 100 miles in width. The third series consists of meridional arcs passing through Sind and the Punjab from Karachi to Attock, thereby uniting the before-mentioned bases of verification at those places; and the whole completes a gigantic geodetical quadrilateral, of which the great arc, between Seronj and Banog, forms the western side, and corresponds with a similar grand quadrilateral on the eastern side, begun and partially completed by our Associate, Colonel Everest, &c.

Too much praise cannot be bestowed upon this most elaborate and important work, carried on as it has been with such precision through countries almost wholly unexplored and injurious to the health of Europeans.

From Mr. J. Walker, the Hydrographer to the East India Company, we learn, that after the measurement of the base of verification near Karachi, a party remained to observe the latitudes, and to compute and register tidal observations; while another party was detached to build towers, to facilitate the triangulation of the Great Indus series. Another party also has been engaged on the North-West Himalaya series, the operations of which were carried on in the region of perpetual snow, and it required all the energy and determination of the parties to accomplish the work assigned to them. The Assam longitudinal series had proceeded eastward, as far as longitude $89^{\circ} 30' 29''$, when the party was obliged precipitately to withdraw for the season on account of the floods. The South-Coast series has been extended to Kuttack; its farther progress, however, was retarded by the whole party having been prostrated by fever.

Topographical.—The Survey of the Plains of the Punjab advances satisfactorily. The work, we are informed, will be executed in a style not inferior to that portion which has already been submitted to the inspection of the members of this Society. The Ganjam Survey continues to progress. As it is now being carried on in a country hitherto almost a blank in our maps, and through a number of petty states, the names of which were hardly known, its completion is looked forward to with much interest.

Revenue.—These surveys are proceeding steadily. The districts of Rajeshaye, Goalpara, and the Julindher Dooab have recently been completed.

Fifty sheets of the 'Indian Atlas' are now published. Several others will be finished during the ensuing season.

Marine.—A new and elaborate survey of the harbour and outer roads of Karachi, has been executed on a large scale by Lieut. Grieve, I.N., and is now being engraved. This harbour, in connection with the railway and electric telegraph, will no doubt become one of the most important stations on the western coast of India. Another sheet of the Survey of the Malacca Strait, extending from Cape Rachado to Mount Formosa, by Lieut. Ward, I.N., has recently been sent home. The Survey of the North Preparis Channel, in the Bay of Bengal, extending from Preparis Island to Cape Negrais, by Lieut. Ward, has also lately been published.

Turkey in Asia.—I have next to notice a memoir on the Map of Damascus, the Hauran, and mountains of Lebanon, from personal survey, by our associate, the Rev. J. L. Porter, containing various journeys in Syria, in the performance of which he corrected many errors in the received geography of that country. About Damascus, he finds that the Bahr el Merj is not one lake, but three distinct lakes, and that the plain around Damascus contains many villages, none of which appear on the map. Balbeck is in error in its bearing from Damascus; the Antilibanus chain requires correction. Thus the author proceeds, pointing out numerous errors in the topography of the country, and concludes by observing that the present Ard-el-Bathauzel is the ancient Batanea.

Mr. Arrowsmith is preparing a beautiful map of Syria and Palestine, in three sheets, for the Foreign Office.

We have next an important paper, comprising notes of a journey from Busrah to Bagdad, with descriptions of some Chaldean remains, by Mr. William Kennett Loftus.

In this paper the author furnishes a highly interesting description of the country through which he passed, both in a geographical

and antiquarian point of view. He visited the sites of some of the most ancient cities upon record, comprising those of Babel, Erech, Accad, and Calneh, mentioned in the Bible ; and, as Sir Henry Rawlinson has observed, Mr. Loftus may be considered as the discoverer of Wurka, perhaps the Erech of the Bible. Mr. Loftus gives minute details of the country and of the various modes of irrigation. He particularly directs attention to the effect of the Hindieh Canal, a branch of the Euphrates, which diverts the main stream from its proper channel, thereby occasioning drought and causing the inhabitants of the villages, in the interior of Mesopotamia, to desert their lands. The Hindieh passes through the Bahr el Nedjef, and forms the Semava branch of the Euphrates. The paper contains much important and valuable information.

It will be remembered that in 1848 a Commission was formed for the purpose of determining the boundary line between the Turkish and Persian empires. Its members were appointed by the English, Russian, Turkish, and Persian Governments, and designated the Turco-Persian Frontier Commission. The chief of the English party was Colonel Williams, the present celebrated Sir William Williams of Kars, under whom Lieutenant Glascott, R.N., acted as chief surveyor, and Mr. Loftus as geologist. We learn from Mr. Loftus, that the surveys extended from Mohammerah to Mount Ararat, a direct distance of about 600 m. ; the operations being trigonometrical on an astronomical basis. The opportunities which occurred for extending the examination of the country enabled careful route surveys, corrected by nightly observations, to be extended as far as Shiraz on the S. ; along the plains of the Euphrates and Tigris to Zobeir, Meshid Ali, and Mosul on the W. ; and across the mountains on the E., along the high plains of Persia, as far as the tomb of Cyrus, Ispahan, Hamadan, Lake Urumia, and Bayazid. The Commission had returned to Constantinople, and were engaged in elaborating the results of their labours when the late war broke out, and a separation of the parties constituting the Commission took place ; the Russians taking with them that portion of the observations which they were contributing.

The accuracy of Lieutenant Glascott's labours has been remarkably exhibited in working out the triangulation of this survey, and the Society has already been indebted to that officer for his map of Kurdistan on a scale of 6 inches to a degree, accompanied by a list of his astronomical positions, which appeared in the sixth volume of the Journal.

The return of peace will, it is hoped, admit of the production of the invaluable geographical material resulting from the international researches of the Commission.

The Vestiges of Assyria, surveyed by order of the Government of India, by Commander Jones of the Indian Navy, and published in three sheets, exhibit the topographical features of the country, in which are situated the ancient cities of Nineveh, Mosul, and Nimrud, over which the labours and writings of Layard and Rawlinson have thrown such a charm.

The return to this country of that distinguished and learned scholar in Eastern languages, Colonel, now Sir Henry Rawlinson, has been announced; and we learn that he has brought to a close, for the present, the excavations in Assyria and Babylonia. A notice of some of his labours has appeared in the Transactions of the Asiatic Society; but they are far beyond any attempt of mine to do justice to them, either in point of value or description. It is with pleasure we learn, that he intends devoting his time to describing his labours and to decyphering the numerous inscriptions he has collected, &c. &c.; a work which, if he succeed in accomplishing, must entitle him to the gratitude of the world: for, hidden under those mysterious mounds and written in those dark inscriptions, may we not hope to find the history of a great nation, whose existence was collateral with that of Israel, and which at many points touched that of the sacred people? May we not hope to read in the records of Assyria, additional proof of those wars and slaveries which are spoken of in the Bible, and to discover traces of those captives, who sat down and wept by the waters of Babylon, and hung their harps upon the willow-trees of a foreign land?

Persia.—Abbott's 'Itineraries in Persia' contain descriptions of such parts of the route from Tehrán through Savé, Kúm, Kashan, and Ispahan, and thence to Yezd, Kerman, Shiraz, and Bunder Bushir, on the Persian Gulf, as have been but seldom or never visited by European travellers. From Bunder Bushir he crossed the Persian Gulf to the mouth of the Shat-el-Arab, as the joint stream of the Tigris and Euphrates is called, and thence by Mohammerah to Bagdad, and by Kermanshah and Hamadan to Tehrán. The route is carefully kept by compass-bearings and estimated distances, and the descriptions of the country, towns, and inhabitants, are carefully given.

Siam.—I mention next in order 'Notes on Siam,' with a new map of the lower part of the Menam River, by our Associate, Mr. Henry Parkes; also an interesting paper, which affords extensive informa-

tion of the inhabitants, productions, and commercial resources of a country of which we had before but a very imperfect knowledge.

Chinese Empire.—Having already alluded to Mr. Meadows' work on China, I have only to mention the publication of a new map of Corea by Andrew Kim, edited by M. Jomard; and to allude to the want of a better knowledge of the northern seaboard of China and of North-eastern Asia generally, including particularly its navigable rivers, which recent events have proved to be so little known.

AMERICA.

North America.—During the present session, the United States Government has presented to the Society, the reports, plans, and sections of the several important expeditions despatched by order of Congress to discover the best route for a railway from the Mississippi to the Pacific, between the 32nd and 49th parallels. These expeditions, organized by the Secretary of War under various leaders, have contributed very largely to American geography, observations having been made from the Mississippi to the Pacific, between the 49th and 47th parallels—the 41st and 43rd—also near the 38th, the 35th, and the 32nd—touching upon the ocean at Puget Sound, San Francisco, S. Pedro, and S. Diego. The report of the Secretary of War, on the results of these labours, concludes, "that the route of the 32nd parallel is, of those surveyed, the most practicable and economical route for a railroad from the Mississippi River to the Pacific Ocean." Other important additions to a knowledge of the North American continent have been communicated in the Ninth Report of the Smithsonian Institution. Lieut. Beale, superintendent of Indian Affairs in California, accompanied by Mr. G. H. Heap, travelled from Westport, Missouri, to Los Angeles, on the Pacific, in 100 days, following the route, near the 38th parallel, to the Little Salt Lake, then turning south-westerly, across the Mohave desert, to the Pacific.

Our gallant medallist, Colonel Frémont, also made a special journey, along the same route, to test the depth of winter snow in the mountainous region. He reached the Huerfano on December 3rd, passed the Coochetope Pass on December 14th, where he found only four inches of snow, and reached the Little Salt Lake settlements on February 9th.

Under the auspices of the Smithsonian Institution, an examination of Northern Wisconsin has been made by Mr. Baird, in regions

almost unknown before, and several lakes and rivers have been discovered and named by him.

Captain Marcy has explored the head waters of the Brazos and Big Wichita Rivers, in Texas, a region never before trodden by white men ; and a survey of the United States and Mexican boundary was also commenced by Major Emory.

Lieutenant Couch, of the United States' Army, has made a scientific journey into Mexico, at his own expense, leave of absence having been granted to him, at the instigation of the Smithsonian Institute. He went to Matamoros and Monterey, examining the adjacent sierras ; thence he proceeded to Parras, the plains of Mapimi, and the Caves of Durango. Among other motives for this journey, was the acquirement of a large collection of manuscripts, maps, and natural objects, made by Luis Berlandier, a Swiss, and a member of the Academy of Geneva, who had resided in Mexico, and devoted himself to Mexican research from 1826 to 1851, when he died. This collection was found very valuable, and purchased from the widow. A catalogue is appended to the Smithsonian Report.

Among various works which have appeared, and which throw light upon the geography and ethnography of America, I notice a 'Mémoire sur les Anciennes Populations Mexicaines,' by M. Ludwig ; a treatise on the Hydrography of the Ohio, by Charles Ellet ; a notice and map of the projected canal between the Pacific and Atlantic through Nicaragua, by M. Dupuy. Mr. J. H. Coffin has written upon the distribution of winds in the northern hemisphere ; and great light has been cast on the comparative philology of the American languages by the labours of the Rev. R. S. Riggs, and his acquirement of the Dakota language. Mr. Julius Froebel has furnished a work on the Physical Geography of North America ; and I notice an excursion to the ruins of Abo, Quarra, and Gran Quivira in New Mexico, by Major J. H. Carleton, U.S.A.

Central America.—In Central America, Mr. E. G. Squier, formerly Chargé d'Affaires of the United States to the republics of the Isthmus, has pursued his indefatigable researches so far, as to cause a survey to be made of the country lying between Puerto Caballos in the Bay of Honduras, and the Gulf of Fonseca on the Pacific. The results of this investigation have been stated in a Report, advocating the construction of the Honduras Interoceanic Railway ; and also in a volume by Mr. Squier, entitled 'Notes on Central America, particularly the States of Honduras and San Salvador, their Geography, Topography, Climate, Productions, Po-

pulation, &c. ;' with an original map and sections, which the author has presented to our library.

Our active associate Mr. Power, of Panama, has recently presented to the Society an important addition to the geography of Central America, in a tracing of an original manuscript map of the province of David, on the frontiers of New Granada and Costa Rica, made from a new survey by Colonel Codazzi. This survey has enabled an interesting portion of the Isthmus to be delineated which was previously a blank on our maps.

West Indies.—The Geography of Cuba has been published by Don Esteban Pichardo, under the auspices of the Royal Junta of Fomento.

Among the Papers of this Session, I notice the Landfall of Columbus, by Captain A. B. Becher, R.N. The first land in the New World that was seen by the great Genoese adventurer is a point of considerable historical interest. Hitherto, in this country, the subject has been treated in works of biography and history ; but it has now been taken up by a really practical hydrographer, and the records of the Spanish archives compared step by step with the configuration of accurate modern charts. In like manner, the spot where Julius Cæsar first planted his foot upon British ground was treated of by the most eminent geographers of their day—D'Anville, Halley, Rennell, and others ; but it has been left for the enlightened Astronomer Royal, from an investigation of certain phenomena which modern science had brought to our knowledge, to prove, with almost mathematical certainty, the precise spot in dispute ;* and thus, by assiduous research and comparison, has our Assistant Hydrographer arrived at conclusions by means of modern delineations with respect to the Landfall of Columbus, which seem to be worthy of equal attention.

South America.—The progress of geographical research in South America has been scarcely less active than in the northern and central parts of the great Western continent.

New Granada.—The course of the navigable river Atrato, which falls into the Gulf of Darien, has been subjected (along with its western affluents and the adjacent streams flowing to the Pacific) to the investigations of several surveying expeditions, despatched by Mr. F. M. Kelley, of New York, at his own expense. For more than fifty years, Baron Humboldt had continued to direct attention to the facilities, which the Atrato was reported to present, for establishing

* See 'Archæologia,' vol. xxxiv.

water-communication between the Atlantic and Pacific Oceans. Actuated by the writings of the veteran geographer, Mr. Kelley has caused the whole course of the Atrato, from its mouth to its headwaters, to be surveyed; and having discovered a route, by way of the Truando, which he deems to be favourable for a ship-canal, he has considered the subject to be of so much importance to the great maritime powers, as to invite an international investigation before any further steps are taken. The scrutiny of the project, which Mr. Kelley has invited from geographers and from civil engineers in this country, has, upon the whole, been favourable to his plan; and his proposal to make a more perfect examination of the locality, seems to be a project well deserving of encouragement.

Lieutenant Gilliss, of the United States' Navy, has presented to the Society two quarto volumes, published by order of Congress, comprising a portion of the results of "the Astronomical Expedition to the Southern Hemisphere" under his orders in the years 1849 to 1852.

Chile.—The first of these volumes, besides a summary of the scientific observations made by Lieutenant Gilliss and the officers under his command in Chile, contains a personal narrative of their journeys in that Republic, and many interesting particulars regarding its present political state. In describing its physical geography Lieutenant Gilliss has frankly acknowledged his obligations to the scientific individuals who, under the patronage of the Chilean Government, have been for some years engaged in investigating, surveying, and describing the geology, topography, and natural resources of the Republic, especially Messrs. Claude Gay, Professor Domeyko, and Messrs. Pissis and Allan Campbell, whose labours have been long known to us in Europe.

It was a source of great satisfaction to Lieutenant Gilliss, upon the completion of his own astronomical observations, to find that the Government of Chile was desirous to purchase the valuable instruments he had with him, as well as the observatory which he had set up. These were handed over to them; and thus Chile may boast of a national observatory, in addition to the various other scientific institutions, already founded by the liberality and enlightened policy of her rulers.

The second volume contains the results of a journey made by Lieutenant MacRae, the next officer of the expedition, across the Cumbre and Uspallata Passes of the Andes, and from Mendoza to Buenos Ayres, his instructions being to make a series of observations for elevation, latitude, and longitude, as well as magnetical and meteorological, for each 3000 feet of elevation on the slopes of the

Andes, and for each 100 miles of longitude on the line of road across the Pampas,—a task which he completed in 60 days.

The results, which are given in a tabular form, constitute an important collection of authentic data for geographers. It is satisfactory to observe how they corroborate the accuracy of the labours of the old Spanish officers, Bauza and Espinosa, whose map of the same line of country over the Pampas was published in the Hydrographic Office at Madrid in 1810. A copious appendix gives a particular account, drawn up by various learned individuals in the United States, of the Indian antiquities, and of the zoological, botanical, and mineralogical collections made by the officers in the course of their travels.

These volumes are beautifully embellished by well-executed plates, especially the natural history part; and the work reflects great credit not only upon the scientific attainments of the officers employed in carrying out the great astronomical and geodesical work entrusted to them, but also on the industry and ability with which they have brought together a large and varied mass of information regarding the countries they passed through; and the Government of the United States has done but justice to their labours in publishing the results of this important survey in the most liberal manner at the expense of the State.

Brazil.—The labours of our Honorary Member, Dr. Martius, in Brazil have come before us recently under a new form, in a volume presented to us by the author, containing fifty beautiful views illustrating the vegetation of Brazil.

Paraguay.—From Lieut. Page, commanding the U. S. Steamer 'Water Witch,' we learn, under date "Buenos Ayres, Dec. 26, 1855," that "the embarrassments arising from the jealous prohibition of the Government of Paraguay have, to such a degree, contracted the field of operations, as to deprive this expedition of the privilege of making contributions to geographical science and natural history to the extent that I had anticipated. I nevertheless hope that our labours will prove not to have been in vain in either of those fields, and that the result may give rise to commercial intercourse with countries fruitful in natural products and susceptible of extended and varied cultivation, but whose resources as yet lie dormant, waiting for the hand of energy and industry to awaken them to life. I allude particularly to those provinces most directly interested in the navigation of the river Salado, a river rising in the Cordillera, in the western part of the province of Salta, and discharging itself into the Paraná at the town of Santa Fé.

“ By our exploration of this river we have shown that the Salado is navigable to within the province of Santiago, without presenting an obstacle, and that, with the expenditure of a little labour, it could, in the course of a few months, be made navigable to within the province of Salta, a distance of not less than 900 miles by land.

“ The navigation of this river will open to the provinces Jujui, Salta, Tucuman, Catamarca, Santiago del Estero, parts of Cordova and Santa Fé, an easy way by which to transport their products and merchandise, which now, under the most disadvantageous circumstances, are conveyed in ox carts of the most unwieldy construction, involving an expenditure of time and money, and prohibiting the exportation of many valuable articles of commerce which could easily and profitably be transported by the river.

“ The river was ascended in a small steamer from its mouth, the distance of 150 m. in a right line, and 350 by the river. This being in July (the season of low water), the steamer could not ascend higher. The river was then entered from its upper waters; its difficulties, its obstacles to immediate navigation throughout the above extent, carefully examined; its rise and fall considered; and the result showed no obstacle that may not easily be removed; and none of those obstacles, such as shoals and banks, which, when removed from one place, reproduce themselves in another.

“ We have recently discovered also a new channel between the island Martin Garcia and the coast of the Banda Oriental, of 2 ft. more water than the old channel contains. The importance attached to this discovery is not confined to the greater depth of water in the new channel, but it assumes a political character. It deprives Martin Garcia of that important geographical position which is attached to it by the Government of Buenos Ayres, in whose hands it is at this time. Instead of Buenos Ayres possessing, as she now claims, exclusive jurisdiction over the old channel, leading into the rivers Paraná and Uruguay, on the ground that her territory is on both sides, over the new channel, she has only concurrent jurisdiction with the Banda Oriental. The new channel is more easily entered, and in it vessels are not obliged to pass nearer to Martin Garcia than $1\frac{1}{4}$ m.; thus taking from this island the perfect command it formerly had over the entrance to the rivers Paraná and Uruguay.”

M. Francis de Castelnau continues the publication of his important journey in South America.

M. Delaporte has published an account of his journey in the country of the Araucanians.

Benjamin Vicuña Mackenna has reported upon the agriculture of Chile and upon European migration to that country.

M. Isambert and M. de Angelis, and Lieut. Maury, U.S.N., have written upon the free navigation of the Amazon.

AUSTRALIA.

By far the most important information we have had communicated to us with regard to this country is the progress which has been made by the North Australian Expedition under Mr. Augustus Gregory.

From this enterprising explorer, whose exploits in Western Australia are well known, by a letter communicated through the Colonial Office, we learn that the Expedition left Moreton Island on 13th September, 1855, in the ship 'Monarch' and the 'Tom Tough' schooner, and after nearly encountering shipwreck at the entrance of Port Patterson, was landed at Point Pearce.

At the time of the last despatch the stock had suffered from the voyage, and the horses were in a weak condition; but the Expedition was in all other respects in an efficient state, and the officers and men were all in good health and full of ardour. The horses having been landed from the ship, were to proceed round the head of the Fitzmaurice, making their way to the Kangaroo Point in Victoria River, whence the Expedition would take its final departure for the interior. No natives had been seen, but it was evident by many fires and other traces that they were numerous on that part of the coast. Through Sir Roderick Murchison some information has been received from Mr. Wilson, the geologist to the Expedition; and Mr. Baines, the artist, has illustrated the country about Moreton Bay by the sketches which have been laid on our table.

The importance of this Expedition in opening out to our knowledge the interior of the northern portion of Australia, in bringing us acquainted with the physical and geographical features of the country, by which we may hope to forward the progress of that most important and desirable object, the settlement of this portion of the continent; the determination of the watersheds of those important rivers, the Victoria and Albert, supposed to have their rise in an extensive range of mountains in the locality to be explored, and of the facilities or otherwise of connecting Carpentaria with

the southern ports, by which the dangerous navigation of the coast and of Torres Strait and the delays from monsoons will be avoided; —the importance, I say, of all this information, which we may expect to derive from this Expedition, cannot be too highly estimated, whether as regards the welfare of the people, or the vast interests which are involved in this country, with respect to that portion of our colonies.

I cannot quit the subject of this Expedition without mentioning an instance of rare liberality in the cause of geographical science which was communicated at one of our evening meetings, during this session, by Count Strzelecki. When the North Australian Expedition was first planned, and when, owing to the length of time which had elapsed before it started, it was supposed that funds were wanting to carry it out, an associate of this Society, Mr. M. Uzielli, generously offered to place the munificent sum of 10,000*l.* at its disposal. Another of our Associates, Mr. W. S. Lindsay, M.P., had also previously offered to contribute largely towards the outfit of the Expedition. As, however, the Government have taken the matter into their own hands, these gentlemen have not been called upon to fulfil their promises; but we must still look upon the offers as proofs, that the labours of the Geographical Society are fully appreciated by practical men, and of the zeal that exists among us for the advancement of geographical knowledge.

In connection with this part of my subject, I next mention a paper by our Associate Captain Stokes of the Royal Navy, on steam communication between our settlements in Australia and this country, India, and China, and on the establishment of a Penal Settlement in connection with a colony in the vicinity of the Gulf of Carpentaria. In this he proposes a new route through Torres Strait, and to render its various passages safe by the erection of lighthouses and the establishment of pilots.

The necessity for improving the navigation of Torres Strait was some months ago brought prominently forward by the great body of the shipping interests in Australia, in a memorial transmitted to this country, and communicated to Lloyd's; and there can be no doubt that the vast interests involved, demand our serious attention; for whether or not the proposed means of communication ultimately become the direct routes to and from those colonies, Torres Strait will still remain the high road of communication between India and the South Pacific Ocean, and between our Southern Australian colonies, India, and China.

New Caledonia.—From the ‘*Annales de la Marine et des Colonies*,’ we learn that the French have made a complete investigation of New Caledonia, and have taken possession of the whole island, and caused the sovereignty of France to be acknowledged.

The loss of a Chinese junk upon D’Entrecasteaux Reef, New Caledonia, has been the occasion of bringing us better acquainted with that most dangerous reef, and with its vast extent and correct geographical position, by Lieutenant Chimmo, R.N., and with its formation and natural history by Dr. McDonald, the assistant-surgeon of H.M.S. ‘*Torch*,’ under Lieutenant Chimmo’s command.

Norfolk Island.—You will have learned from our ‘*Proceedings*’ that Norfolk Island, in a complete state of preparation, and with all its buildings, has been appropriated to the use of the Pitcairn Islanders, who have all consented to be transferred there. The planting a colony consisting of persons of such exemplary moral conduct, and of such uniform piety, may perhaps exercise a beneficial effect upon the other islands of the Pacific within their influence.

Bonin Isles.—The Bonin Islands have obtained some notoriety lately, from the mention which has been made of them by Commodore Perry of the United States’ Navy, who considers them to be of great importance from their geographical position, and that they may be looked upon as offering to a maritime nation a most “valuable acquisition.” In an early stage of the question this officer claimed them as the property of the United States, under the impression that the group had been visited by an American citizen before the islands were formally taken possession of by myself in 1827. But having since learned from the Address of our late President, the Earl of Ellesmere, that the individual in right of whom he claimed them, was an Englishman, he has generously acknowledged that he was probably misinformed. And here I would leave the matter, except that I think it due to myself to reply to his remark, “that in naming these islands I had very unjustly overlooked the name of Coffin, who had visited the southern part of the group before I had.” To this I have only to plead entire ignorance of Captain Coffin ever having visited these islands at all, until I read the remarks of Commodore Perry. The right of possession from priority of discovery is a question of which nations are naturally jealous; but I trust that not only in respect of these islands, but in all other cases, our relations will be such, that our ports will be mutually open for the general benefit of navigation and commerce.

NEW PUBLICATIONS.

Numerous donations have been presented to the Society, including 4 atlases, upwards of 350 maps and charts, and 663 volumes and pamphlets; affording an excellent proof of the desire to bring its members acquainted with the publications of the day, and denoting a sense of the Society's usefulness. A complete list of these will be printed as usual in the Journal, and many have been specially alluded to in the course of the Address. Among the donations contributed by our own countrymen, though not at present associated with us, may be mentioned the learned work on the Chinese and their Rebellions, by Mr. Meadows, which will receive further notice in the 'Proceedings.'

Our associate, Mr. Alexander Keith Johnston, has completed the new edition of his superb Physical Atlas. The publication of the first edition of this great work, ten years since, had the effect of introducing in this country almost a new era in the popular study of geography, through its attractive and instructive illustration of the prominent features of the science. This second edition is to some extent an entirely new work, owing to the additions and improvements which have been introduced. I have only to refer to the names of Murchison, Forbes, Brewster, Ami Boué, and Berg-haus, to stamp the high character of the work; but I must not omit to mention, among new contributions, the Geological Map of Europe, by Sir Roderick Murchison and Professor Nicol; that of America, by Professor Rogers; General Sabine's Map of Terrestrial Magnetism; the Distribution of Marine Animals, by the lamented Professor Edward Forbes; and the addition of a large general Index adds materially to the utility of this extensive compendium of Natural Geography.

The Imperial Atlas of Modern Geography, edited by our associate, Dr. Blackie, of Glasgow, has reached its twelfth number. The maps are very neatly and correctly executed by some of our best cartographers.

The Royal Illustrated Atlas, with an introductory notice on the existing literature of geography, by Dr. Shaw, is also in course of publication by Messrs. Fullarton, and has reached its eighth part. The design of this atlas goes beyond the ordinary scope of unadorned cartography, in combining with the maps, picturesque vignettes and illustrations of the countries and their inhabitants. The maps are prettily drawn according to the latest

authorities, and the pictures, which form an unusual, though instructive feature of the work, are neatly engraved.

I may include in this notice of our own labours, a beautiful Map of Madeira, published in London, in the English language, and dedicated, by permission, to this Society, by our Corresponding member M. Ziegler of Winterthur. The physical features of this island, including the distribution of its vegetation, are skilfully portrayed; and in addition to his own observations, Mr. Ziegler acknowledges the assistance he has derived from the labours of Captain Vidal, R.N., and Sir Charles Lyell; and especially from the communications of Mr. Hartung, whose portfolios are rich with the researches of six winters. Such a map cannot fail to prove valuable to the geographer, and an interesting companion to those who seek in Madeira, for a milder climate than our own.

The successful researches which have been prosecuted among the mounds of Mesopotamia have led to the production of a series of three beautiful Maps for the Government of India, by Commander Jones, I.N., delineating the remains of Khorsabad, Nineveh, Selamiyeh, and Nimrud.

One of the latest communications received from our lamented Corresponding member, Vicomte de Santarem, contained the donation of a copy of the fac-simile published by the Vicomte of the large Map of the World drawn by Fra Mauro in 1459. This fac-simile is of the same size as the original, and published on six sheets.

Among our members who have contributed to Crimean geography may be now mentioned Mr. G. Cavendish Taylor, who has recently published a Journal of Adventures with the British Army, in two volumes.

One of our earliest members, General Monteith, whose Map of Georgia and the Caucasus was engraved several years since by the Society, and still remains in repute, has lately published a volume on Kars and Erzeroum, with an account of the Campaigns of Prince Paskiewitch and of the Russian Conquests beyond the Caucasus.

Mr. William Ferguson, our associate, has published his journal of a visit, entitled 'America by River and Rail, or Notes by the Way on the New World and its People.'

Dr. J. D. Hooker and our associate Dr. Thompson have published, separately, their Introductory Essay to the Flora Indica, including outlines of the Physical Geography and Botany of the Provinces of India.

A fine Map has been published lately by Mr. Stanford, con-

taining the eastern frontier of the Cape of Good Hope, drawn by Mr. Henry Hall, of the Ordnance department in that colony, whose merits as a cartographer are well known. This map appears very opportunely, as it includes the country of the Bassutos, where disturbances are apprehended. Mr. Stanford has also presented a copy of the new edition of Baily's Map of Central America, with corrections from the recent surveys of Squier, Codazzi, and others.

Capt. Burton has completed the narrative of his dangerous journey to Mecca and Medina, in the disguise of an Affghan pilgrim; and he has also published an account of his visit to the African city of Harar, which had been deemed inaccessible, owing to the savage and hostile character of the chief, as well as of the people.

Our associate, Captain Charles F. A. Shadwell, R.N., C.B., has added to his useful publications on navigation a case containing, on a dozen cards, 'Formulæ of Navigation and Nautical Astronomy;' also another work on the Management of Chronometers.

The labours of other Members have been alluded to in various parts of this Address in connection with the different countries to which they relate.

PHYSICAL GEOGRAPHY.

During the past year there has appeared, under the direction of the zealous superintendent of the Ordnance Survey, an abstract of the operations, carried on in Ireland, for the purpose of referring the mean water levels upon various parts of the coast to a common standard. Although these observations have long been discussed by our Astronomer Royal, and will be found in the Transactions of the Royal Society, yet it is only now that the complete details of the operations have been published; and as the observations present this curious result, viz. that the mean sea level is higher upon the northern part of Ireland than upon the southern part, and as no notice of this has ever appeared in our Journal that I am aware of, I take this occasion of observing that, if we take as the standard Courtown, in Wicklow—a spot remarkable as having no perceptible rise or fall of its tide, and about midway on the axis of the great tidal wave between the extremities of Ireland—we shall find that the mean sea level stands higher on the north of Ireland (Ballycastle) by 0.881 feet and lower on the south (Castle Townsend) by 0.938 feet than it does at Courtown. I know it will be interesting to many of our Associates to have these facts inserted in their Journal.

Of late, various papers have appeared on the circulation of the waters of the ocean ; and as new facts are received, the interest of the subject increases. The labours of America have in this respect been very fruitful ; Lieutenant Maury, our able and newly elected Corresponding member, has laboured deeply in this field, and has shown us with what accuracy he has determined the course and velocity of the Gulf Stream, by the remarkable agreement between the real and calculated position in which the unfortunate ' San Francisco ' was found, after being disabled and drifting many days in the strength of the current.

The American Surveying Expedition, under Lieutenant Lee, has also contributed to the subject ; and, while pursuing its observations upon the streams of the ocean, has largely added to our store of ocean temperatures at various depths, and has furnished us with a most interesting section of the basin of the Atlantic, which will throw considerable light upon the practicability of the project of connecting the two great continents of Europe and America by a telegraphic wire.

Mr. Findlay, our Associate, has added to his former contributions on the subject of ocean streams ; and Captain Irminger, of the Danish Royal Navy, has supplied us with information as to a new course of the stream on the coast of Greenland.

It has been the practice of my predecessors to notice the progress of magnetic science from the natural connection between the compass and topographical operations. During the past year a committee has been formed at Liverpool for the purpose of inquiring into that subtle subject, the disturbance of the compass in iron vessels. They have made a report of their labours, up to the end of the year, to the Board of Trade, which presents some curious and interesting results, and they are still continuing their investigations. The Board of Trade encourages this inquiry, so manifestly advantageous to the shipping interest, by an annual grant of money.

The question of local attraction in ships has also engaged the attention of our learned and indefatigable Astronomer-Royal, who has recently furnished a valuable paper on the subject to the Royal Society.

Various papers on this subject by other authors also have been published since the last anniversary, of which some have been read before the British Association at Glasgow, particularly those by Dr. Scoresby, and by Mr. Towson.

It will be interesting to know that Mr. Piazzzi Smyth, the Astro-

nomer-Royal at Edinburgh, is about to proceed to Teneriffe, to make astronomical observations on the summit of the famed Peak of Teyde.

The distinguished author of the 'Law of Storms,' Sir William Reid, has published a notice of the motion of winds and storms in the Mediterranean, and drawn a comparison between the gales and forces of the winds of Malta and of Bermuda. The work embodies a memorandum by our valued associate, Captain Graves, R.N., on the advantages which shipping will derive from pursuing a certain course in the Mediterranean, with respect to prevailing winds at certain seasons of the year.

I am happy to be able to announce the completion of an important series of observations upon the tidal streams of the seas around our own shores, which have been carried on for several years in a small vessel, which the Admiralty liberally placed at my disposal. These observations are of great importance as regards this particular branch of science, as they satisfactorily establish, in tidal waves of a peculiar character, the existence of a simultaneous turn of stream throughout the wave, notwithstanding the remarkable fact of there being a progressively increasing tidal establishment. This theory was advocated in two papers under my own hand, printed in the 'Transactions' of the Royal Society; and it has now been further confirmed by numerous observations. The result will facilitate and simplify the navigation of our channels, and will affect much that has been written upon the subject of tides.

In connection with this branch of physics, I mention a work by Mr. F. A. Keller, an able hydrographical engineer of the French navy, entitled, '*Exposé du Régime des Courants dans la Manche et la Mer Allemagne.*' The author has endeavoured to arrange the results derived from the first series of the observations, published, as before mentioned, in the Philosophical Transactions, in a manner which, he is of opinion, will render them more generally useful to mariners.

Lieutenant Maury has furnished a pamphlet on 'Lanes for Steamers,' or upon the routes which he would have steamers follow, when passing between England and America, in order to render this much frequented route more safe, by diminishing the chance of collision. In addition to lessening the danger of these passages, Lieutenant Maury points out several other advantages which would attend the adoption of his plan, and gives much useful information on the course of the Gulf Stream, as well as on districts where fogs and gales are most frequent, and the times when they most prevail.

CONCLUSION.

I have now laid before you as much of the general outline of the state and progress of Geographical science during the past year, as may be conveniently comprised within the limits of an Address, and I feel satisfied that there is much upon which the Society may be congratulated. The numerous communications made to the Society during the Session from all parts of the globe—the animated and enlightened discussions upon them, which are recorded in our useful periodical, the ‘Proceedings,’ which has been so successfully started, and the enlarged dimensions which our Journal has attained under the careful editorship of our zealous Secretary, Dr. Norton Shaw—are proofs of the many and fruitful sources whence information flows to us; and when we recollect how few of our evening meetings have been passed within these walls without some positive addition to the science we cultivate, we shall be able to comprehend the progress that is continually being made in Geographical research, and the great increase of the general interest which it excites. But it is not in the pages of our records alone, that the full benefits of the Society are seen—the mere facts added, year by year, to our store of knowledge, are but the promise of the successes before us, and of benefits to be derived from our labours. It is impossible to read the list of names enrolled as members of this Society without feeling convinced that its labours are considered valuable to every interest and to men of all professions; for it is not the geographer alone who will be found thus supporting our efforts: side by side with him stand the politician and the merchant, who regard with deep interest new enterprises opened out for commerce; and next to him the divine, who foresees in the extension of our science, fresh means of spreading the blessings of Christianity, and its attendant, the civilization of man. And so I might pass on to other professions, all concurring in the same sentiments and interests. In this union of views we cannot but foresee the enlarged success of the Society; and feel that it is with no exaggerated hopes we may look forward to its steady and satisfactory progress, and to its increasing importance and usefulness.

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PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1856-7.

First Meeting, Nov. 10, 1856.

REAR-ADMIRAL F. W. BEECHEY, PRESIDENT, in the Chair.

ELECTIONS.—*Capt. Cole; Colonel the Hon. A. H. Gordon, C.B.; Sir Charles Nicholson; Commander Montagu F. O'Reilly, R.N.; and W. P. Andrew; J. Entwistle; G. K. Fairholme; J. B. Heath; W. H. Hovell; A. Hodgson; and William Staniland, Esqrs., were elected Fellows.*

DONATIONS.—Among the more important donations presented to the Society, since the last meeting, were the Ordnance Maps of England and Wales, so far as published, on the scale of one inch to a mile; also the Ordnance Maps of Lancashire, Edinburghshire, Haddingtonshire, Kirkcudbrightshire, Lewis Island in Ross-shire, and Wigtonshire, all on the six-inch scale; Admiralty Charts; Robinson's 'Biblical Researches;' Commodore Perry's 'Narrative of an Expedition to the China Seas and Japan,' *etc.*; Fullarton's 'Gazetteer of the World;' Quartermaster-General's Map of the S.W. Crimea; Crawford's 'Dictionary of the Indian Islands;' Light-house Map of the British Isles by the Board of Trade; Burton's 'Harar;' Sir R. McClure's 'Discovery of the North-West Passage' by Sherard Osborn; Becher's 'Landfall of Columbus;' Fleming's 'Southern Africa;' Charts of the French 'Dépôt de la Marine;' Hughes's 'Geography;' Maps of Ireland and of Scotland, from Mr. Stanford; Transactions of various Societies, *etc.*

ANNOUNCEMENTS.—The PRESIDENT announced to the Meeting that since they last separated, the Expedition to Eastern Africa had been despatched under the command of Captain Richard F. Burton, who, he hoped, would be joined at Bombay by an officer of the Indian Navy, and at Zanzibar by the Church Missionary, Mr. Rebmann. From the enterprising character and experience of these individuals, the most favourable results might be expected.

Despatches had also been received from Dr. Livingston, announcing his arrival at Tete, and subsequently at the Mauritius,

after the successful and unprecedented journey across the continent of Africa, from west to east. The President paid a high compliment to this enterprising traveller, and as he was shortly expected in England, he had postponed the reading of his papers until the Society should have the advantage of his presence.

The PRESIDENT next adverted to the offer which had been made by Dr. Baikie, F.R.G.S., to ascend the Niger, and as there was reason to expect this enterprise would shortly be undertaken, he would ask Sir Roderick Murchison to say how it stood at present.

SIR RODERICK MURCHISON said that it would be very gratifying to the Geographical Society to learn that Lord Clarendon had, from the first, expressed his desire to promote the expedition in every way; and he hoped it might soon be authoritatively announced to the Society, that the expedition would have the support of her Majesty's Government, and be conducted by the same officer who had led the former expedition up the Chadda.

The PRESIDENT then addressed the Society upon the subject of a letter, which the Secretary had received from that distinguished Arctic traveller, Dr. E. K. Kane, who had expressed deep regret at being prevented by illness from being present at the Meeting. The President had deferred answering this letter in the ordinary routine, as it afforded an opportunity which he was sure the Meeting would wish to avail themselves of—that of communicating to Dr. Kane, their sentiments on the occasion.

SIR RODERICK MURCHISON said, that with the permission of the President he would make a motion to that effect. It had always been their custom to welcome travellers of distinction to this country, but he was sure that on no occasion whatever, had any traveller from another land come to England, who had done so much to advance an object that was dear to Britain; who had gone so far to rescue the lives of persons in a great expedition, in which they, as geographers, had a great interest. There was no person who had ever come to this country, who ought to be received with a warmer welcome than Dr. Kane. His energies had been directed towards the attainment of an object in a manner which had called forth the approbation of every man of science, who had attended to the progress of his search, and read the remarkable book he had recently published. Dr. Kane had gone farther to the north than any Arctic explorer except Parry; and when he said that this remarkable man came with the intention of assisting Lady Franklin, in the endeavour to carry out by his own enterprise, the object that was at the heart of that noble-minded woman, and that he was prevented from doing so, by illness alone—when he

said this, he was sure Dr. Kane was entitled to the additional sympathy of all the geographers there present. Therefore he was proud to be the person who should make the motion ; and without occupying more of their time he would read the Resolution :—

“That, on the occasion of the arrival in this country of the eminent Arctic explorer, Dr. E. K. Kane, of the United States,—who, for his arduous and zealous endeavours, under the auspices of Messrs. Grinnell and Peabody, to rescue Franklin, and the important additions he had made to geographical knowledge, had received the Gold Medal of the Society :—the President do communicate on the part of the Fellows, the expression of their sincere regret, upon learning that this distinguished man should have been prevented by ill health, from appearing at this meeting, to receive the unanimous and hearty welcome which awaited him.”

Captain SHERARD OSBORN, R.N., C.B., begged to second the motion. He ventured to do so, as one conversant with Arctic matters, and having examined Dr. Kane's reports, he was sure that never did Arctic traveller go through more extraordinary trials, or meet them with more courage and energy.

The PRESIDENT heartily concurred in the motion. He hardly knew whether to admire more in Dr. Kane, his great enterprise and perseverance, or his extraordinary modesty and generosity ; but that he possessed these qualities, and everything that would fit him for a traveller, there could be no question. He deeply regretted that indisposition prevented Dr. Kane from following up the course which he had so successfully begun.

The resolution, having been put to the Meeting, was unanimously passed, amidst an expression of general sympathy.

The following papers were then read :—

1. *Report of the Progress of the North Australian Expedition.* By Mr. A. C. GREGORY.

Communicated by the Right Hon. H. LABOUCHERE, Colonial Office.

Victoria River, 14th June, 1856.

SIR,—Circumstances having arisen which render it necessary that the vessel, attached to the North Australian Expedition, should proceed to Timor for supplies, I avail myself of the opportunity to transmit a brief account of the operations of the Expedition to the present time, and its prospective movements.

In my letter of the 23rd September, 1855, I detailed the pro-

ceedings of the Expedition to that date, the 'Monarch' sailing the next morning.*

Having organized a party to proceed by land with the horses to the upper part of the Victoria, consisting of myself, Mr. H. Gregory, Dr. Müller, Overseer Phibbs, and six men, the remainder of the party embarked in the 'Tom Tough' schooner, to which the sheep had been removed from the 'Monarch,' Mr. Wilson being instructed to ascend the Victoria and form a camp at some suitable spot for disembarking the sheep, if practicable, near Kangaroo Point; and in accordance, the schooner sailed from Point Pearce on the 25th September.

On the 28th, I started from the camp at Providence Hill with the horses, which had been reduced to forty-one, and many of these scarcely able to travel, pursuing an easterly course through level forest country of indifferent quality, till the 3rd October, when we ascended MacAdam Range, which proved to be only the deeply serrated edge of the vast sandstone table-land, which occupies so much of this N.W. coast of Australia.

On the 4th October, one of the horses was seized with sudden illness, and died in four hours; and on the 10th, a second horse was lost under similar circumstances.

On the 11th, the party reached the Fitzmaurice River and camped on a small dry creek; but the tide rising in the night, the alligators ascended the creek from the river and attacked the horses which were feeding on the land, severely wounding three. On the same day a horse had been abandoned, being too weak to travel.

Crossing the Fitzmaurice on the 13th, at the lowest point at which it was fordable—the water being fresh, 20 yards wide and 2 feet deep, with a rapid current—we steered southward, and traversed some fine grassy valleys during this day; but soon reaching the stony hills beyond, we were compelled to leave two more horses, as they were completely exhausted, having been for some days so weak that they could not rise without assistance.

The country now became more rocky, so that we did not reach the banks of the Victoria till the 18th, when after a difficult descent from Sea Range, we camped, one mile north of the "Dome."

The two following days were occupied in travelling up the Victoria, the distance being greatly increased by having to head a deep salt-water creek, which joined the river opposite Kangaroo Point. On the 20th we reached the camp, which had been established by the party from the schooner, on the left bank of the river, in lat. 15° 34' S.

* See Proceedings, No. I., p. 5; No. II., p. 32, 33, 49; No. IV., p. 79.—ED.

Here I learned that the schooner had got aground about eight miles below Curiosity Hill, on the 27th September, and had not yet been got afloat, though the tide had driven her over several banks; that she had sustained much injury, and leaked so much that a large quantity of the stores was damaged.

The following day I proceeded down the river in one of the boats, and reached the 'Tom Tough' on the 22nd.

The schooner had not moved for some days, and the leaks were in some degree lessened by nailing battens and tarred blankets over the seams, which had opened. Being bedded 4 feet in the sand, I could not examine her bottom, though the bank was dry at three-quarter ebb.

Several of the deck-beams were fractured, and there were many indications of her being much strained, by the tide having worked deep holes at the bow and stern, and then leaving her dry on a narrow bank amidships.

The tides were too low to float her till the 24th, after which every succeeding tide carried the vessel a short distance higher up the river, and on the 27th she cleared the banks and reached Sandy Island. On the 29th, she moored at the camp, where there was a convenient spot for discharging the cargo and repairing the vessel.

On examining the schooner, the keelson was found to be broken near the mainmast, three of the deck beams broken, and nearly all the knees which secure the deck much strained from their places. The butts of several of the planks were started, and much of the copper torn off.

There having been on several occasions, 3 feet of water in the vessel's hold, much of the cargo was damaged; more than half the bread, sugar, and other dry provisions belonging to the vessel being wholly destroyed. The stores belonging to the Expedition, from being more carefully packed, did not suffer so much; about half a ton of flour, the same quantity of rice, 3 cwt. of salt, and 8 cwt. of sugar being destroyed, besides which, many packages of stores were damaged by the water leaking through the deck.

The greatest loss, however, which the Expedition has sustained, is the large number of sheep which have perished, owing to the long destitution on board the schooner. Out of 161 sheep embarked at Point Pearce, only 44 reached the camp with sufficient vitality to recover.

The early part of November was devoted to erecting a store, and discharging cargo from the vessel, preparatory to repairing her.

This being the driest season of the year, the horses had not improved sufficiently in condition to fit them for work. On the 15th

I therefore attempted to ascend the river in the gutta-percha boat, but soon after passing "Palm Island" the dry banks became so extensive that I relinquished the attempt, and returned to the camp, the heat of the sun having so completely destroyed the water-proofed canvas, of which the boat was constructed, that it was scarcely kept afloat during the latter part of the return voyage.

A few showers of rain having somewhat refreshed the grass, the horses showed some improvement. I therefore selected seven of the strongest, and on the 24th proceeded up the Victoria with a party consisting of Mr. H. Gregory, Mr. Wilson, and Dr. Müller.

Leaving the river a short distance below "Steep Head" we made a detour to the southward, and traversing a fine grassy country which extended to Beagle Valley, struck the river a few miles above the highest point examined by Captain Stokes.

Following the river upwards, we passed to the east of FitzRoy Range, and entered a deep gorge or ravine, bounded by cliffs of sandstone from 50 to 300 feet high. Through this ravine the river wound, forming deep reaches, sometimes several miles in length, and only separated by narrow banks of shingle or rock. The average course being nearly south, we soon reached lat. 16° S., when the valley suddenly expanded into a vast plain covered with excellent grass. In this plain were several isolated hills of trap or basalt, the decomposition of which adds much to the fertility of the soil.

Having traced the Victoria to lat. $16^{\circ} 26'$ S., long. $131^{\circ} 10'$ E., we returned to the camp, which was reached on the 13th December.

During our absence, such of the men as could be spared from the general duties of the camp, had been employed in cutting timber for strengthening the frame of the schooner.

The wet season had now set in, and the surface of the country became so soft, that the horses could scarcely be collected together at the camp.

The rugged character of the precipitous sandstone ranges which intersect the country, and the boggy condition of the plains, combined with the fact that the greater part of the horses, suited for draught, had been comprised in the number of those who had died, precluding the employment of the drays, it became necessary to explore the country with packhorses. Accordingly a party was organised, consisting of Mr. H. Gregory, Mr. Baines, Dr. Müller, and Messrs. Flood, Phibbs, Bowman, Deane and Fahey, thirty packhorses, and six saddle-horses.

With this party I started on the 3rd January, 1856, to explore the interior, south of the Victoria.

The flooded state of the country near the Victoria, compelled us to

traverse the rocky ranges to the westward of the river. The rugged nature of the country, the intense heat of the atmosphere, loaded with moisture, conjoined with the ordinary difficulties which attend exploration in a new country, rendered our progress extremely slow; many of the horses were lamed, though shod before starting, and two had died before we reached lat. 17° S.

I therefore selected a suitable spot for a dépôt in lat. $17^{\circ} 3'$ S., long. $130^{\circ} 35'$ E., and on the 31st January proceeded with Mr. H. Gregory, Dr. Müller, and Charles Deane, seven pack and four saddle horses, leaving the remainder of the party in charge of Mr. Baines.

Steering a southerly course, on the 7th February we reached the southernmost waters of the Victoria in lat. $18^{\circ} 12'$, long. $130^{\circ} 39'$, and crossed the dividing ridge between the waters flowing to the N.W. coast and those which fall into the interior; the elevation by barometric measurement being only 1300 feet above the level of the sea.* Continuing our route we descended into a nearly level and depressed country, and struck a small water-course trending to the S.E. On its banks there was abundance of grass, and a little water was found in the deeper portions of the channel.

This creek was followed to lat. $18^{\circ} 22'$ S., long. $130^{\circ} 49'$ E., where it was lost on a wide grassy plain, surrounded by level sandy country covered with triodia and stunted trees.

On the 9th, lat. $18^{\circ} 31'$, long. $130^{\circ} 44'$, was attained, but further progress was evidently impracticable, as we had reached a sandy desert country extending far to the south, in which neither water nor grass existed, little or no rain having fallen during the wet season; to the south of the dividing ridge, the elevation of this point was 1000 feet above the sea.

I now determined on following the northern limits of this desert to the westward, in hope of finding some creek or river, which, descending from the ranges to the north, might enable us to cross or at least penetrate this inhospitable region. Keeping therefore to the west along the foot of the sandstone range, on the 13th we came to the head of a creek in lat. 18° , long. 130° . This creek first trended N.W., but soon turned to the S.W.

For the first hundred miles, the country on the right bank consisted of vast level plains of rich soil, covered with beautiful grass; but the left bank presented a striking contrast in its low sandstone ranges, producing little besides triodia and scrub-trees.

The country on both banks now changed gradually to a sandy

* See Capt. Stokes's remarks at p. 191.—ED.

desert, with low, barren sandstone hills, and long parallel ridges of red drifting sand, straight, equal in height, and with a direction exactly east and west. This desert country was not altogether destitute of vegetation, but thinly covered with triodia (the spinifex of Australian explorers), and a few scattered bushes of eucalyptus, acacia, and hakea.

After following this stream-bed, which I named Sturt's Creek, for nearly 300 miles, its channel terminated in a series of dry salt lakes, which occupied the lower portion of a large depression in the desert, the centre being in lat. $20^{\circ} 16' S.$, long. $127^{\circ} 35' E.$, and 900 feet above sea-level.

No outlet for the waters of these lakes could be discovered, though carefully sought for, and the great height at which the inundations of the country had remained for considerable periods, was evident from the abundance of mussel shells which remained in their natural position, embedded in the soil 20 feet above the dry bed of the lake, and more than a mile beyond its ordinary limits.

Surrounded on all sides by a sandy desert, in which it was hopeless to look for water or grass, and deprived of these essentials which the creek had afforded in sufficient quantity to enable us to proceed thus far into this inhospitable region, it was useless to attempt to penetrate the country to the southward, and no alternative remained but to retrace our steps while it continued practicable; for as no regular rains had fallen in this part of the country for at least twelve months, our supply had been generally derived from small muddy puddles, which resulted from heavy thunder showers which had fallen in the early part of the month. Most of these water-holes had now dried up, and I am doubtful whether our horses could have performed the long stages between the remaining watering-places, had not the open character of the country enabled us to travel at night, and thus avoid the scorching rays of an intertropical sun.

On the 11th March, we commenced retracing our steps up Sturt's Creek, and on the 24th, having reached the head of the creek, struck off to the N.E. to avoid the waterless country traversed on the outward route. In lat. $17^{\circ} 42'$, long. $129^{\circ} 58'$, we crossed the dividing ridge between the northern and southern waters, the elevation being 1660 feet above the sea, and, descending into a valley, came on a small dry creek trending N.W. This we followed for 30 miles, and then steered E.N.E. for 50 miles, over level grassy country, destitute of water, and reached the dépôt camp, in the valley of the Victoria, on the 28th, found the party in good health and the horses much improved in condition.

As the horses I had employed on the excursion into the interior required a few days' rest, I selected six from those at the dépôt, and on the 2nd April, accompanied by Mr. H. Gregory, Mr. Baines, and John Fahey, proceeded to the eastward to examine the country in that direction. Traversing for 60 miles a splendid grassy country of trap formation, well watered by numerous creeks, we reached the eastern boundary of the valley of the Victoria, then turning northwards traced the river down to $16^{\circ} 26'$, and connected this route with that in December, 1855. Returning to the dépôt by a more direct route, we reached that camp on the 17th.

On the 21st, I broke up the dépôt camp and proceeded towards the lower part of the Victoria river, examining such portions of the right bank as had not been previously traversed, in order to ascertain if any considerable tributaries joined from the eastward, and on the 9th May reached the main camp.

The party at the main camp were all in good health except Henry Richards, who had lost the use of his right hand from falling down among some sharp reeds, one of which had pierced his wrist. The crew of the 'Tom Tough' had not escaped so well. The carpenter, John Finlay, had died on the 22nd April, and three of the seamen had been left on shore at the camp, that they might be under the immediate medical care of Mr. Elsey, the schooner having been moved down the river on the 2nd April.

Although this great amount of sickness is, in some degree, attributable to the re-development of previous disease, yet it more directly results from the bad quality and improper description of the provisions with which the vessel is supplied, and it has been absolutely necessary to furnish provisions from the stores of the Expedition for the use of the schooner's crew, their only remaining provisions consisting of salt beef of indifferent quality, biscuit much damaged by cockroaches, and tea.

The 'Tom Tough' was now moored below the shoals at Musquito Flats, and had been so far repaired by the unceasing energy of Captain Gourlay, that she was nearly ready for sea; a strong frame having been fixed inside the timbers, the seams caulked, and the butts secured. She now only makes 10 inches water per diem, whereas that was previously the usual quantity per hour. Great credit is due to the captain for the manner in which this work has been performed, having done all the smith's work and much of the carpentry with his own hands.

It is now my intention to proceed with the exploration of the country towards the Gulf of Carpentaria, and I have accordingly instructed the master of the 'Tom Tough' to proceed to Coepang for

supplies, and thence to the Albert River to co-operate with the land expedition.

The greatly reduced number of horses, and the impracticability of employing the drays for the conveyance of stores, have rendered necessary a modification in the manner and arrangement of the exploring parties, and on the present occasion I shall employ a party of seven persons, as it is desirable that the party should not be entirely dependent on the assistance of the vessel at the Albert River.

The remainder of the exploring party will proceed in the schooner to the Gulf of Carpentaria, and on the junction at the Albert River of the two sections of the Expedition, the party will be reorganised, and, if practicable, continue the overland route to Moreton Bay.

Enclosed I transmit a sketch* of the country traversed by the Expedition to the present time, and, as it may render it more intelligible, append a few remarks on the physical character of the country.

It may be considered to be a table-land of sandstone rising abruptly from the low land on the coast; it attains an average level of 700 feet on the banks of the Victoria in lat. 17° S.; 900 feet in lat. 16° ; 1600 feet in lat. 18° , which is the maximum, as the country falls to 1300 in 19° , and 1100 feet in lat. 20° .

The upper bed of sandstone is about 300 feet thick, and rests on soft white, green, and red shales, which are superincumbent on a coarse cherty limestone, and jasper. Large tracts of these two upper strata have been removed, and left large valleys and plains through which the rivers run. South of lat. $16^{\circ} 30'$ trap or basalt has been poured out into these valleys and formed plains or table-topped hills, sometimes isolated, but more commonly grouped together.

The sandstone, by its decomposition, usually forms a poor sandy soil, but occasionally fine grassy plains. The limestones, which occupy large extents of the valleys, are generally covered with a light loamy soil, producing abundance of grass; but the richest soil results from the decomposition of the trap rocks, which are so largely developed in the upper valleys of the Victoria, that at a moderate computation, they occupy a million of acres. This, added to the good country on the head of Sturt Creek, the lower part of the Victoria, and the Fitzmaurice, would make an aggregate of three million acres of available grazing land, already traversed by the Expedition.

Except iron ore, which is frequent, minerals are rare, only few traces of copper and slight indications of coal being observed.

Of the vegetable productions, little favourable can be said, for however interesting many of the plants may be to the scientific

* In the Map-room of the Society.—ED.

botanist, yet, with the exception of the grasses, which are very numerous, there is scarcely a single vegetable production which can be rendered practically useful. Timber is scarce, the best growing near Point Pearce.

In conclusion, it gives me pleasure to record the ready co-operation and assistance I have experienced on the part of the officers, and the exemplary conduct of the men attached to the Expedition, and that, under circumstances of privation, which few, who have not experience, ever fully appreciate.

I have, &c.

(Signed)

A. C. GREGORY,

Commanding N. A. Expedition.

*To his Excellency Col. Sir W. T. Denison, R.E., F.R.G.S., &c.,
Governor-General of Australia.*

MR. MERIVALE, F.R.G.S., said he would only detain the Meeting a moment while he stated one or two facts concerning the Expedition, which had been received by Her Majesty's Government, but too late for communication to the Society. They had been received from Mr. M'Lean, H. M. Consul at Surabaya, in a report dated Sept. 3rd last. The account which had been read, left Mr. Gregory intending to despatch his schooner, the 'Tom Tough,' for repairs to Timor. It appeared that the schooner went to Timor, and she arrived in such a condition that some of the men considered their lives were unsafe, and they insisted upon the vessel being taken to Surabaya. She was accordingly taken there, and, having been examined, it was said that she could have got back from Timor, but that having come so far, and having to return against a strong head-wind, she would require much repair. Mr. Baines, with great promptitude, obtained another vessel, an English schooner, the 'Messenger,' which was at Surabaya, and on the 30th of August he left that place for the Gulf of Carpentaria, hoping to meet Mr. Gregory on its shores. Mr. Baines, however, expressed considerable alarm lest he should arrive too late, and Mr. Gregory should be reduced to straits. He hoped that these fears might prove unfounded, for it was believed that supplies had been sent by Sir W. Denison from New South Wales in a vessel called the 'Torch,' which would probably reach the Gulf before Mr. Baines arrived.

CAPTAIN STOKES, F.R.G.S., said no one could listen to the despatch just read with greater interest than himself, as he was one of the party that first discovered and explored the Victoria. It appeared that Mr. Gregory had examined one branch of the Victoria about 350 miles; or twice the distance, roughly speaking, that it was explored by the 'Beagle's' party. About 100 miles below the source of this branch, there was another coming from the south-east, which only appeared to have been traced down some 20 miles; but Captain Stokes believed that it led more into the interior, and was of greater consequence than the branch which Mr. Gregory had followed.* No doubt his instructions carried him to the south-west, and he naturally took the branch that led in that direction. His further journey, about 350 miles to the south-west, was one of great geographical interest, inasmuch as it showed the north-west boundary of the desert and the limits of the area drained by the rivers west of the Victoria. His account of the red drift sand, so exactly corresponded with what Captain Sturt met with some 400 or 500 miles eastward, that they might conclude that the whole of the intervening country was of the same character—a sandy

* See p. 187.—Ed.

desert, impassable, and fatal to any hopes of overland communication between South Australia and the North-west Coast. In support of this idea, Captain Stokes referred to Mr. Austin's expedition from Western Australia, where, about the parallel $26\frac{1}{2}^{\circ}$ and meridian 117° , he discovered the south-westerly boundary, evidently of the same sandy desert. It was an accumulation of lakes in rainy seasons, and of dry mud and arid sands in the hot seasons. Another indication of the extent of the desert, was the character of the central part of the North-west Coast, which Captain Stokes was the first to visit in the year 1841, when he was quite satisfied, from its singular resemblance to the Pampas of South America, that all within was a desert; and this would give a fair idea of its westerly limit. Going back to Mr. Gregory's exploration of the upper part of the Victoria, it appeared that he had met with a considerable extent of good country, which proved that the Victoria had not been overrated. Australia was, it was well known, deficient in navigable rivers, and when the Victoria was discovered and found navigable, it was regarded as an important stream; and, compared with the Murray in the south, it was called the great river of North Australia. The Victoria has this advantage over the Murray, that it always had a navigable entrance, while the mouth of the Murray was almost impassable. Mr. Gregory's discovery of so much good country on the Victoria, favoured the proposal to establish penal settlements in North Australia. He alluded to this, because the every-day police reports convinced him that the ticket-of-leave system was a failure, and transportation the only remedy. He would, in conclusion, express the hope that the same success would attend Mr. Gregory in the further and more important part of his expedition between the Victoria and the Albert. He should have much preferred that Mr. Gregory's instructions had confined him to tracing the chief sources of the Victoria, especially towards the south-east, and then proceeding eastwards to Carpentaria. If these had been his orders, what might have been the result? Instead of hearing of him still on the Victoria river, we would have heard of his arrival on the Albert.

The PRESIDENT said they were much indebted to Captain Stokes for his observations. When they remembered that Captain Stokes was present at the discovery of that river himself, and had traced it on foot for some distance inland, every word which fell from him must be of interest.

MR. LATROBE, F.R.G.S., congratulated the Society upon the success which had thus far attended this effort. He considered that it had been conducted upon the only principles which could induce them to look for good results, and if, as Sir Roderick Murchison said, the expeditionary party hugged the coast, they might really hope for great results. As to the interior, it appeared now to be a perfect blank on the map; he was afraid it would remain so, and that they might write upon it "*Sahara Australis*."

The peculiar character of the winds which proceeded from the great N.W. interior to that part of New Holland with which he was acquainted, showed that this interior must be a desert—an arid waste, throwing off an intense heat in summer, and, during the period of the winter rains, originating a chilly wind, possessing many of the peculiar characteristics of the hot winds. Like these, it appeared to move on a plane parallel to the earth's surface. It exercised a similar influence upon vegetation, causing plants to droop and the leaves of the acacia to close, although the winds from southward, bringing with them a far greater degree of cold, might produce no such effect. He hoped that they would remain satisfied with the attempts already made to penetrate directly into the interior beyond the head waters of known streams, and not risk the loss of life and tempt the fate of Leichhardt.

SIR RODERICK MURCHISON, in reply to a question of the President regarding the geology of North Australia, said he had little or no information to give respecting it, since no details had yet arrived. There were, indeed, a few

observations in the despatch of Mr. Gregory, and portions of a letter he had received from Mr. Wilson, the gentleman selected as geologist of the expedition, which would at a future meeting, be brought before the Society. The success which had already attended the expedition was highly gratifying to him, for he was one of its earliest advocates when the Duke of Newcastle was in office; and it was that statesman who first gave attention to the representations of the Geographical Society on the subject. What had fallen from Captain Stokes explained very clearly that object of the expedition which was considered of the greatest importance, *i. e.* not merely to discover the extent of the great interior saline desert, or whether there might or might not be a practicable route from Northern to Southern Australia; but to determine first the true water-parting, and having ascertained the source of the Victoria, then without further delay to travel along that high-land, and proceed at once to the Gulf of Carpentaria before the resources of the expedition were exhausted. He should, therefore, exceedingly regret, in conjunction with Captain Stokes, if through the exhaustion of their resources the leading objects of the expedition were not attained, by opening out that great line of intercourse which he hoped to see established between Sydney on the south and the Gulf of Carpentaria on the north. He hoped, however, that Mr. Gregory would have ample provision to enable him to effect that object. They must, at all events, give that gentleman all credit for having overcome great difficulties, and for having already solved a curious geographical problem. If he should demonstrate the practicability of the other suggestion, he will have achieved a most important result.

2. *Notes of a Journey up the Sadong River, in North-West Borneo.*

By A. R. WALLACE, F.R.G.S.*

THE Sadong is the first considerable river east of Sarawak, from which it is distant about 25 miles, and forms a portion of the territory lately ceded in perpetuity by the Sultan of Borneo to Sir James Brooke.

About 20 miles up this river, a small stream, the Simunjon, enters from the east, a few miles up which, on an isolated mountain, coal of good quality has been discovered, and is now being worked. At this place I spent the whole of the dry season of 1855, engaged in making collections of birds and insects, and more particularly in hunting the great orang-utan or "mias," which is there particularly abundant. I succeeded in shooting 13 of these extraordinary animals, and in accumulating a mass of information about them, which will, I trust, tend to clear up many obscure and doubtful points in their natural history. I had intended to devote the latter part of the dry season to a somewhat extended journey into the interior, but an unfortunate wound in my foot rendered me incapable of leaving the house for three months of the very finest weather, and it was not till the rains had begun that I was enabled to walk. As the time which I had fixed for leaving Borneo, was

* See Proceedings, R. G. S., No. IV. p. 97.—Ed.

now drawing near, I determined to return to Saráwak, by crossing the country between the head waters of the Sadong and Saráwak rivers; and as I am not aware of any account of this district or of its inhabitants having been published, or indeed of the whole of it having been previously visited by any European, I beg leave to submit my notes to the Royal Geographical Society.

The whole of the lower part of the Sadong valley is a forest plain, with scarcely a single spot of dry ground, except where a few isolated hills rise abruptly from it. It is a vast morass of a black vegetable mud, resting on a yellow clay. The surface is as nearly as possible on a level with the sea at high water. In such a country it may be supposed that the lower part of the river is monotonous enough. The banks are cultivated as paddy fields by the Dyaks and Malays; and their little thatch huts alone break the unpicturesque line of muddy banks, crowned with tall grasses and sedges, and backed by the tops of the forest trees behind the cultivated ground. It took me a day and a half from the mines to reach the Malay village of Gudong, where I stayed an hour to make some purchases of fruit and provisions, and called upon the Datu Bandar, or Malay governor of the place. His house was very spacious, but very dirty both outside and in. He was particular in his inquiries about the coal, the use of which the natives cannot realize. They are besides quite puzzled at the extensive and costly preparations made for working it. At the village of Jahi I found the stream so swift on account of a slight flood, that my heavy boat could make no way against it, and I was obliged to remain a day to obtain a smaller one, and fresh men to take me up to the first village of Hill Dyaks.

I succeeded here in meeting with a Malay boy, named Bujon, who wanted to return to Saráwak, and agreed to accompany me, and who, as he knew the language of the Sadong Dyaks, having traded among them, was a very important acquisition. Leaving Jahi in a very small open boat, we proceeded more pleasantly, and in a few hours got beyond the cultivated country to where the virgin forests come down to the water's edge. At night we had some difficulty in finding dry ground to sleep on, the river's banks being generally flooded. Early in the morning we reached Empugnan, a small Malay village, situate at the foot of a mountain of the same name, which had been visible from the mouth of the Simunjon river, and is apparently isolated. In the dry season the tide reaches this place. From here the vegetation becomes much finer. Large trees stretch out their arms across the stream, and the high earthy banks are clothed with ferns and scitamineous plants.

Early in the afternoon we arrived at Tabokan, the first village of the Senankan Dyaks. On an open space near the river about twenty boys were playing at a game, something like what we call 'prisoner's base;' their ornaments of beads and brass wire, and their gay coloured kerchiefs and waist-cloths, showing to much advantage and forming a very pleasing sight. Being called by Bujon, they immediately left their game to carry my things up to the round head-house, which is attached to most Dyak houses, and serves as the lodging for strangers, the place for trade, the sleeping-room for the unmarried youths, and the general council-chamber. It is generally elevated on very lofty posts, has a large fireplace in the middle, and windows in the roof all round, and forms a very pleasant and comfortable abode. In the evening, after dusk, the house was crowded with young men and boys who came to look at me. They were mostly fine young fellows, and I could not help admiring the simplicity and elegance of their costume. Their only dress is the long "chawat" or waist-cloth, the ends of which hang down before and behind. It is generally of blue cotton, ending in broad bands of red, blue, and white. Those who can afford it, wear a handkerchief on the head, which is either red with a narrow border of gold lace, or red, blue, and white like the "chawat." The large, flat, moon-shaped brass earrings, the masses of white or black beads round the neck, brass rings on the arms and legs, and armlets formed of sections of a great, white conical shell, all serve to relieve and set off the pure reddish brown skin and jet black hair. Add to this the little pouch containing materials for betel-chewing, and a long slender knife, both invariably worn at the side, and you have the everyday dress of the young Dyak gentleman.

The "orang-kaya," or rich man, as the chief of the tribe is called, now came in with several of the older men; and the "bitchára," or council, commenced about getting me men to go on the next morning. As I could not understand a word of their language, which is very different from the Malay, I took no part in the proceedings, but was represented by my boy Bujon. A Chinese trader was in the house, and he too wanted men the next day; but, on his hinting the same to the orang-kaya, he was sternly told that a white man's business was now being discussed, and he must wait another day before his could be thought about.

The next morning we started in a boat, about 30 feet long and 2 feet 4 inches wide. At this point, the stream abruptly changes its character. Hitherto it had been deep and smooth, though swiftly flowing, and confined by steep banks covered with vegetation. Now it rushed and rippled over a pebbly, sandy, or rocky bed, here and

there forming miniature cascades and rapids, and throwing up on one side or the other, extensive banks of finely-coloured pebbles. No paddling could make way against it, but the Dyaks with bamboo poles, propelled us along with great dexterity and swiftness, never losing their balance, though standing up and exerting much force in such a narrow and unsteady vessel. It was a brilliant day, and the cheerful exertions of the men, the rushing of the sparkling waters, with the bright and varied foliage, which, from either bank, stretched over our heads, produced an exhilarating sensation, which I had not felt since leaving the grander waters of South America.

Early in the afternoon we reached the village of Borotoi; and, though it would have been easy to reach the next one before the evening, I was obliged to stay, as my men wanted to return, and others could not possibly go on with me without the preliminary talking. Besides, a white man was too great a rarity to be allowed to escape, and their wives would never have forgiven them, if, when they returned from the fields, they found that such a curiosity had not been kept for their examination.

Walking out to a small hill near, cultivated as paddy fields, I had a fine view of the country, which was becoming quite hilly, and toward the south, mountainous. I took bearings and sketches of all that were visible, which much astonished the Dyaks, who accompanied me, and produced much conversation when we returned, with a request to exhibit the compass.

The next morning we proceeded as before; but the river had become so shallow and rapid, and the boats were all so small, that though I had nothing with me but a change of clothes and a gun, with the scantiest possible *batterie de cuisine*, two were required with five men to take me on. The rock, which appeared occasionally on the river's banks, was an indurated clay-slate, sometimes highly crystalline, and thrown up nearly vertical. To the right and left of us were isolated mountains, which I knew to be limestone by their peculiar outlines, and by the whiteness of the numerous precipices they presented, no doubt an extension to the eastward of the limestone of the Saráwak river. The river bed was a mass of pebbles, mostly pure white quartz, with, however, abundance of jasper and veined quartz, which often presented a beautiful appearance. It was only 10 in the morning when we arrived at Budw; and though there were plenty of people about, I could not induce them to allow me to go on to the next village, only three hours farther.

I walked out to the paddy fields, which are here very extensive, covering a number of the little hills and valleys into which the whole country seems broken up, and obtained a beautiful view of

hills and mountains in every direction. In the evening the "orang-kaya" came in full dress (a spangled velvet jacket, but no trousers), and invited me over to his house, where he gave me a seat of honour, under a canopy of white calico and coloured handkerchiefs. The great verandah was crowded with people, and large plates of rice, with cooked and fresh eggs, were placed on the ground as presents for me.

The costume of the Dyaks on ordinary occasions, though scanty, is highly becoming, but when they attempt to make themselves extremely fine on state occasions, they only succeed in becoming ridiculous. *In civilized countries it is the same.*

The river was now so shallow, that boats could ascend only with much trouble: I therefore preferred walking to the next village, first presenting the orang-kaya with some tobacco and a pickle-bottle, which latter he greatly esteemed. I had expected to see the country in this walk, but the path lay almost entirely through thickets of bamboo, which here springs up wherever the forest has been cleared away. The Dyaks get two crops off the ground in succession—one of paddy and one of sugar-cane, maize, and vegetables. The ground then remains eight or ten years before it is again cultivated—and soon becomes covered with bamboos, or grasses and shrubs, which often arch over the path and shut out everything from the view. At half-past nine we reached the village of Senankan, where I was again obliged to remain the whole day, which I at length agreed to do on the promise of the orang-kaya that his men should take me through two other villages across to Senna, on the Upper Saráwak River. I therefore amused myself as I best could, by walking about to the high grounds near, to get views of the country round till the evening, when another public audience, with gifts of rice and eggs, and drinking of rice-beer, took place. These Dyaks cultivate much ground, and supply a good deal of rice to Saráwak. They are rich in gongs, brass trays, wire, silver coins, and all such articles in which a Dyak's wealth consists, and their women and children were all highly ornamented. Here, as among most uncivilized people, there seems no gradual transition in the women between youth and age. From the pleasing and often elegantly formed girl of twelve or fourteen, a very few years of married life and hard labour, transforms them into coarse middle-aged women.

In the morning, after waiting some time, and the men that were to accompany me not making their appearance, I sent for the orang-kaya, and found that both he and another head man had gone out for the day, and on inquiring the reason of this extraordinary proceeding, was informed that they could not persuade any of their

men to go with me, as I afterwards found, because the journey was long and fatiguing. As I was determined to get on that day, I told the few men that remained, that the chiefs had behaved very badly, and I should acquaint the Rajah with their conduct, and that I insisted on proceeding at once. Every man present made some excuse, but after much trouble and two hours' delay, we succeeded in getting off. For the first few miles, our path lay over a country of a very singular character, cleared for paddy fields. It consisted of abrupt hills and valleys, very steep, but of very slight elevation, all terminating in sharp ridges and hillocks, with not a patch of level ground. It was a mountain region in miniature. After crossing the Kayan River, a fine stream, which is in fact a larger branch of the Sadong than the one I ascended, we were on the lower slopes of the Sebóran Mountain, and the path lay along a sharp ridge which led up to the mountain, and afforded an excellent view of the country round. The features were exactly those of the Himalaya in miniature, as described by Dr. Hooker, and might be considered as a natural model of some part of those vast mountains, on a scale of about one-tenth, thousands of feet being here represented by hundreds. I now found the source of the beautiful pebbles which had so pleased me all up the river. The slaty rocks had ceased, and all these mountains appeared to be a conglomerate sandstone, in some places a mere mass of pebbles cemented together. I ought to have known before that such a small stream could not produce such vast quantities of well-rounded fragments of quartz and agate. They had been produced in past ages by the action of some large continental stream, before the great island of Borneo had risen from the ocean.

About mid-day we reached the village of Menyerry, beautifully situated on a spur of the mountain, about 600 feet above the valley, and affording a delightful view of the mountain region of this part of Borneo. I here first got a view of the Penrhissen Mountain, at the head of the Saráwak River, and one of the highest, if not the highest in this district, rising probably to near 6000 feet above the sea-level. The Rowen Mountain to the south, seemed nearly equally lofty. It is situated near Sikyam, on a tributary of the Pontianak River; and in the same direction, but much more distant, appeared the lofty mountain Nutowan.

Descending from Menyerry we again crossed the Kayan, which bends round the foot of the spur; and ascended to the pass which separates the valleys of the Sadong and Saráwak Rivers, and forms the boundary of the Saráwak district. The height of this point must be about 2000 feet. The descent from here was very fine. A

deep rocky stream rushed on each side of us, down to one of which we gradually descended over numerous bamboo bridges, over the gulleys, or along the faces of precipices. Some of these were several hundred feet long, and fifty or sixty feet high, a single smooth bamboo 3 inches in diameter forming the only pathway, and a very shaky handrail of the same material, rendering the passage almost as perilous as that of the aerial bridge by which the followers of the Prophet are said to enter paradise.

Late in the afternoon we reached Sodos, situated on a space between two streams, but so surrounded by fruit-trees that little could be seen of the country. We stayed here for the night, and found the house very spacious, clean, and comfortable, and the people very civil and obliging.

In the morning early, we continued our descent to Senna, along a fine valley, with mountains rising 2000 or 3000 feet on every side. The stream rapidly increased in size till, when we reached Senna, it had become as large as the Sadong, above Tabokan, with the same abundance of sand and pebbles. Here too, the upheaved slaty rock again appeared, with the same dip and direction as in the Sadong. At Senna, I remained for the day, as the river was now navigable for boats to Saráwak. An unexpected difficulty however presented itself. The Senna Dyaks had no boats, they did not know how to make them, and never used them. It seemed strange to see people living by the side of such a fine stream without making use of it; but I found that they were true mountaineers, who had only come down the valley about twenty years ago, and had not yet got into new habits.

The people of Menyerry and Sodos are all of the same tribe. They make excellent paths and bridges, and cultivate a great extent of mountain land. Their district has therefore a more pleasing and civilized appearance, than in those places where the people move about only in boats, and confine their cultivation to the banks of the streams.

With some difficulty, I hired a boat from a Malay trader, to take me down to the next village, and found three Dyaks who had been several times with Malays to Saráwak, and thought they could manage a boat very well. They were, however, very awkward, constantly running aground, knocking up against rocks, losing their balance, and almost upsetting themselves and the boat, offering a striking contrast to the consummate skill in boatwork of most other Dyaks. At length we came to a really dangerous rapid where boats were often lost, and the men, conscious of their incapacity, were afraid to go on. Some Malays, with a boat-load of rice, here over-

took us, and, after passing down with great skill, kindly sent back one of their men to assist me. This he did very well, for my Dyaks, in the critical part of the passage, lost their balance, and had they been alone, would certainly have upset the boat. The river was exceedingly picturesque, the ground on each side being cleared at intervals for paddy-fields, affording a view of the country. Numerous little farm-houses were built high up in trees overhanging the river. They were reached from the bank by a bamboo bridge, and had a most curious appearance. At intervals, too, were hanging bridges crossing the stream, and suspended from trees on either side. One of them is well figured in Mr. Low's work on 'Saráwak.'

Reaching the village of the Sebungo Dyaks, I remained there that day, and the next proceeded to Saráwak, passing through a most beautiful country, where limestone mountains, with their fantastic forms, white precipices, and rich vegetation, shoot up on every side. In one of them is a cave which I visited, and which, except that it passes completely through the spur of a lofty mountain, offers nothing remarkable. The banks of the Saráwak river are everywhere covered with fruit-trees, the most numerous being the durian, a magnificent forest-tree, bearing a terrifically spiny fruit, the size of a melon, and which deserves to be ranked as the king of fruits. No tropical fruit, I have yet seen, can bear any comparison with it. They were ripe, and we enjoyed them to perfection.

I shall now proceed to a few general observations on the geography and geology of the country I passed through, and on the characteristics of its inhabitants.

Geography, &c.—Taking the latest map of Borneo as professing to represent the geography of the country, according to the best authorities, I will point out a few alterations which seem to me to be required. First then, the territory of Saráwak must be considerably extended; the boundary line passing rather south-east from Penrhissen Mountain, which exactly agrees in position with Mount Sebauh of the maps, and which will increase its area at least one-third. The mountain group at the head of the Saráwak and Sadong Rivers, is completely separated from the Cape Datu Mountain, which terminates in the Poey Mountain in lat. $1^{\circ} 35' N$. South of this an extensive plain occurs, over which a fine view as far as the coast of Sambas, is obtained from the Serambo Mountain, near Saráwak. In the position occupied by Mount Raja on the map, *no hills exist*. Farther east, all the hills must be placed more to the south, and it seems probable from all the information I can obtain, that they soon cease altogether; a gently inclined divide, only, existing between the tributaries of the Batanglupar and those of the Kapuas

or Pontianak River. The Linga River, the first branch of the Batanglupar from the south, flows through a flat and swampy country almost from its source, near the Klingkang Mountain; and the passage from the higher part of the Batanglupar to the great lakes of the Upper Kapuas, is described as being over a scarcely elevated, certainly not a mountainous country. I am inclined, therefore, to believe that the little mountain district, from which flow the Saráwak and Sadong Rivers on the north, and the Sikyam and Landak on the south side, forms the central nucleus of the north-western end of Borneo. These rivers, in their upper part, are true mountain streams, flowing swiftly over gravelly beds, or rushing over rocky ledges, and forming so many little rapids and falls, that we cannot put their descent at less than 25 to 30 feet a-mile, probably much more. Now, on the Sadong, more than 30 miles of the river has this character, while 20 more is a deep and swift-flowing stream. This would give an elevation of a thousand feet for the base of this mountain region, showing that it differs essentially in character from those mountains nearer the coast, which, though of equal elevation, rise abruptly from a flat and marshy country which is scarcely elevated above the level of the high tides.

Geology.—The geology of the country is exceedingly difficult to elucidate, owing to its great complication, to the difficulty of obtaining sections, and the excessive rarity of organic remains. In no case have I been able to ascertain, by direct observation, the order of superposition of any of the formations. The most extensive formation in the country is a ferruginous sandstone conglomerate. This composes most of the mountains near the coast, and also the whole of the central mountain region. Between these and often in contact with them, occur limestone and porphyritic or trappean rocks, and a hard slaty rock, which is sometimes highly crystalline. The sandstone rocks are generally inclined at an angle of from 7 to 20 degrees with the horizon, while the slaty rocks are always nearly vertical. No distinct stratification is observable in the limestone, which forms abrupt and fantastically formed isolated mountains, often presenting mural precipices of much grandeur, and it is in these that the *hirundo esculenta* forms the gelatinous nests, which are so great an article of luxury with the Chinese. On my sketch-map* the dip and direction of the strata are noted, wherever I observed them.

It is in the sandstone and the clayey beds which alternate with it, that the coal occurs, and there seems little reason to doubt that it is of

* In the Map-room of the Society.—Ed.

the tertiary formation, as the most abundant fossils are impressions of exogenous foliage, exactly similar in character to that of the trees which now cover the surface. I have also seen what appear to be leguminous fruits, and the shells found in the Labuan coal-field, were all of an extremely recent type. Now as the sandstone of the interior almost exactly corresponds with that of the coal formation, we may conclude that it also is tertiary, the principal difference being, that some beds of it contain a greater quantity of quartz and limestone pebbles. The presence of volcanic rocks with contorted limestone, sufficiently explains the vertically-upheaved stratified rocks, which appear to underlay the sandstone. The limestone is highly crystalline, and is probably an ancient formation, as it contains slender-stemmed encrinites; and the slaty rocks which occur in all the river beds between the coal mountains and those of the interior, are probably of equal or greater antiquity. A considerable tract of country between the limestone hills, is covered with an alluvium of gravel and clays, the surface of which is very undulating, and in this the gold-washing is principally carried on. It seems to rest upon the limestone, which often pierces through it in strange water-worn peaks, which resemble ruined buildings, or ancient monuments. It is in cavities of the limestone also, that the antimony ore is found; and near the junction of the trap-rock with the limestone, a fine hot spring has recently been discovered.

We may therefore, in general terms, describe the Saráwak district as consisting of ancient limestone and slaty rocks and of modern sandstone with coal. In the interval between these deposits, violent volcanic action has taken place, which has resulted in the trappean mountains; and this action has been renewed since the most recent rocks have been formed. With the very scanty information we yet possess on the subject, more detail than this would be out of place.

Ethnology.—The manners and customs of the Aborigines of Borneo have been so often described, that I shall only now make a few observations on what has been less generally noticed—their physical, mental, and moral characteristics. The Dyak is closely allied ethnographically to the Malay, more remotely to the Chinese and to the Indians of South America, who are all united by so many similarities, that we must consider them as branches of one great division of mankind, the Mongolian race. All are characterised by a reddish brown skin of various shades, by jet-black straight hair, by the scanty or totally absent beard, by the rather small and broad nose, and high cheek-bones. In one character only is there any disagreement among them;—in the Chinese and Tartar races the eyes are oblique, while in the Americans and Malays this

peculiarity either does not exist, or is very slightly developed. The average stature of the Dyaks, seems intermediate between the Malays and Chinese, being rather greater than the former and less than the latter, though the local differences are in all very great. Their whole forms are well proportioned, their hands and feet small, and they are seldom so stout as either the Chinese or Malays, while the coronal region of the head, is better developed than in the latter races.

It is highly curious that countries so distant as Borneo and the valley of the Amazon, between which we can by no possibility imagine any direct communication to have ever taken place, should yet contain indigenes so similar to each other; for between some tribes of Dyaks and of Amazon Indians, I can call to mind no one physical distinction. We can only explain the circumstance by supposing both to have had a common origin, and shall thus have additional reason for supporting the views of Dr. Latham and others, who consider the Americans as Mongols who have emigrated direct from Eastern Asia. We may also suppose that similarity of climate and other physical conditions, have tended to produce the remarkable resemblance I have alluded to, both tribes inhabiting districts under the Equator, where the surface is everywhere covered with virgin forests, and where excessive heat and moisture constantly prevail.

In mental capacity it is probable that the Dyaks would be fully equal to the Malays or Chinese, while in moral character they are undoubtedly superior to either. They may be said to bear the same relation to the Malays, that the Tartars do to the Chinese. They are simple and honest, and become the prey of the Malay traders and chiefs, who cheat and oppress them whenever they have the opportunity. The Dyak languages are very various, and differ very considerably from each other. In some, nearly half the words are pure or modified Malay, while in others, there is scarcely a word exactly the same in the two languages. In some of the names of places, there is a strange similarity to the Celtic; thus, *Penrhissen*, *Lundu*, *Siniaven*, *Senna*, are most of them true Welsh names, and as the Celtic languages have an Eastern origin, and there is a considerable Sanscrit element in the Malay, and as besides there is reason to believe that Hindoos were once settled in Borneo, it seems possible that these are not mere accidental coincidences, but indications of a common origin of the former inhabitants or languages of Britain and Borneo—countries which we can now only place in juxtaposition, as representing nearly the extreme points on the scale of civilization.

Having compared the Dyaks with some of the indigenes of South America as to their physical characters, it may be as well to extend

the comparison to their mental qualities as exhibited by their sports, their weapons, and their general habits. In these too there is a very considerable general resemblance, though much difference in the details. The Dyaks are more lively, more talkative, and less diffident than the Americans, and therefore pleasanter companions. They have more amusements and are more social, while at the same time they have less variety of weapons, and are less skilful in their methods of obtaining game and fish. Both these circumstances will lead us to place them one degree higher in the scale of civilization. Among the Indian boys of the Amazons, I never observed any other amusements, than imitations of the more serious occupations of the men. The bow and spear, the blowpipe or the canoe, were employed in their sports and games, which were thus the school in which they became qualified for the duties of manhood. This is a characteristic of the truly savage state. The Dyak youths, on the other hand, have their social games, their trials of strength and of skill. They amuse themselves with pegtops like our English schoolboys, and I was surprised to find them fully initiated in all the mysteries of the in-doors game of "scratch-cradle," of which they had modifications unknown to us. They possess besides numerous puzzles and tricks of great ingenuity, with which they amuse themselves on dull evenings or during wet weather. These apparently trifling matters are yet of some importance, in arriving at a true estimation of their social state. They show that these people have passed beyond that first stage of savage life, in which the struggle for existence absorbs their whole faculties, in which every thought and every idea is connected with war or hunting or the provision for their immediate necessities. It shows too an advanced capability of civilization, an aptitude to enjoy other than mere sensual pleasures, which, properly taken advantage of, may be of great use in an attempt to raise their social and mental condition.

The moral character of the Dyaks is undoubtedly high. They are truthful and honest to a remarkable degree. It is often impossible from this cause to get an opinion from them, for they say, "If I were to tell you what I don't know, I might tell a lie;" and if they relate any thing voluntarily, you may be sure that they are speaking the truth. The fruit-trees about their houses have each their owner, and it has often happened that on asking a Dyak to gather me some fruit from a tree, he has replied, "I can't do that, for the owner of the tree is not here;" never seeming to contemplate the possibility of acting otherwise. Neither will they take the smallest thing belonging to a European, without asking permission. They will pick up scraps of torn newspapers or crooked pins, and ask as a

great favour whether they may have them. In other moral qualities they are also above most uncivilized, and perhaps also above most civilized, nations. They are temperate in food and drink, and the gross sensuality of the Chinese and Malays is unknown among them. They have but one fault—a fault common to all nations in a half-savage state, except perhaps the African races—an apathy and dilatoriness, which, however annoying to the Europeans who come into contact with them, cannot be considered a very grave offence, or be held to outbalance the many excellent qualities they possess.

Few subjects are of greater interest, or of more vital importance to the welfare of a people, than the state of the population, its increase or decrease, and the causes by which it is affected. In my visits to the Hill Dyaks, I was much struck by the apparent absence of those causes, which are generally supposed to check the increase of population, coupled with the evidence of a population almost stationary or very slightly increasing. The conditions generally supposed most favourable for the increase of population, are an abundance of food, the absence of polygamy, and early marriages. Here these conditions all exist. The people produce far more food than they consume, and exchange the surplus for ornaments, gongs, and small cannon, which constitute their wealth. On the whole, they appear remarkably free from disease; marriages take place early, though not too early, and old bachelors and old maids are alike unknown. The number of births is, however, below the usual ratio, and a sufficient cause may be found in the fatiguing occupations to which the women are subjected.

3. *Proposed Exploration of Borneo.* By Lieut. C. A. C. DE CRESPIGNY,
R.N., F.R.G.S.

LIEUT. DE CRESPIGNY, R.N., submitted his proposition for the more thorough exploration of Borneo. He reasoned that Borneo ought to be better known, on account of its riches, its fertility, and above all, its position, situated as it is, in the direct route between China and Australia, between which two countries, it is not difficult to foresee, that there will be as great a trade as now exists between Europe and Australia. In addition to this, Lieut. De Crespigny was anxious to discover the ruins of a large stone city said to exist in Koti, in the east of Borneo, and the truth of a rumour of a tribe of fair people, living in the mountainous region of Kinibalu, with light hair and blue eyes. In reply to a question Lieut. De Crespigny said he had been employed in the survey of the north-west coast in 1848, and had taken that opportunity to learn the Malay language, and to gain information of the manners of the people.

He was of opinion that the character of both Malays and Dyaks had not been fairly reported upon. He knew them to be hospitable and honest, and did not think the Malays had a fault. The Dyaks certainly were addicted to taking heads, but upon the whole they were an inoffensive race, and he felt confident that he would be well received by them.

With regard to the means, he proposed that the Society should use their influence with the Admiralty, to have him placed upon full pay on the books of one of the guard-ships in this country, to provide him and his servant a passage to Labuan, and to lend him a few instruments and a small medicine-chest from their stores, and provide him with one or two other necessaries. Should this application fail, it would make no difference in his resolution, but it was absolutely necessary that he should be found a passage to Labuan.

He then pointed out the curious fact, that the north-west coast, which has been visited by so many of our ships, and which is the most important part of the country, is not known beyond a hundred yards in the jungle, with the exception of a few places, three of which, viz., Rejang, Bruni, and Tampanak, he had seen.*

The PRESIDENT said, when they considered the vast extent of country proposed to be traversed, no less than 600 miles in length and ten or eleven degrees of longitude in breadth, the nature of the climate and the reputed character of the natives—considering, too, that Lieutenant De Crespigny desired no assistance, no companions, that he intended to travel alone—he could not but admire his courage and enterprise. There was, besides, a further independence about this undertaking: the Lieutenant sought no aid from the Government or from that Society, or any Society, beyond that which the Admiralty might reasonably grant, which was, his full pay and a free passage to the site of his proposed adventures. When he looked at the vast extent of the route which he proposed to traverse, the opening out of a country said to abound in minerals and other valuable productions, and promising to be of great commercial importance, he could only hope that the project might be successfully carried out; that the Admiralty would listen to the proposal, and that the Society might have the happiness and advantage of reading in this room the relation of the successful performances of his enterprising and gallant friend.

MR. JOHN CRAWFORD, F.R.G.S., trusted that Lieutenant De Crespigny would have the support of that Society—he thoroughly deserved it; and that the Society would strongly recommend his case to the patronage of the Government. Previously to Mr. Wallace, whose journey had just been described to the Society, two travellers had already gone in among them, one from the north-west side, and the other from the south side—Mr. Dalton and Mr. Burns, a grandson of the poet. Borneo was nearly five times the extent of Great Britain, and nine times the extent of Ireland. It was inhabited by a rude people. There were upwards of 100 different tribes at the least; he had himself counted upwards of 50; and every one of these had a totally distinct and separate language. In fact in this respect, as well as in some others, Borneo far more resembled a huge block cut out of tropical America or tropical Africa, than any other country in the world. Now, as to its productions. It was not

* See preceding paper by Mr. Wallace.—ED.

rich in vegetation useful to man. The island had, however, a great variety of valuable minerals. It is indeed the richest mineral country in the East. Its coal formations were most extensive, stretching right across from Bruni to Banjarmasin. Mines are worked at both extremities ; by the English at the north-west, and by the Dutch at the south side. An English company, called the Eastern Archipelago Company, was mining upon an extensive scale, and had invested an immense sum of money, not less perhaps than 160,000*l.*, consisting of steam-engines, pumps, and there was even a railway of a mile. It was expected soon to produce 60,000 tons of coals a-year. They knew the vast demand likely to arise for coal in connexion with our Eastern steam navigation. Iron was very abundant : he believed it to be a magnetic ore, from which the Dyaks are enabled to manufacture steel and iron superior to the best Swedish ; at least it was so in the estimation of the natives, because they gave a higher price for it. Sulphuret of antimony was found in considerable abundance, more plentifully than in any other country. The history of the discovery of that mineral was curious enough. A gentleman of his acquaintance, like many other English gentlemen fond of scribbling in newspapers, wanted a subject to write about. He went to a bazaar for one, and found it in a mass of antimony. This was in 1823. A small portion of it was smelted to a regulus, and it turned out to be a sulphuret that had been brought from Saráwak ; and most of the antimony we now import, 1500 tons annually, comes from that country. Sir James Brooke, by the aid of these antimony mines, was enabled to maintain the best government, native or European, ever established in Borneo. He had a population of nearly 30,000 under his authority, consisting of Dyaks and a great many other tribes ; and considering what a strange, rude, anomalous population he has under him, it is certain he administers his government with eminent skill. Gold is produced in considerable quantities on the west coast. He believed there were 50,000 Chinese working the gold mines on the west coast, but they were much discouraged by the Dutch government. They produced about half a million pounds sterling annually, which is about one-thirtieth part of the produce of California or Australia, and that after they have been working there for a whole century. Diamonds were also produced. Among the vegetable productions was gutta percha, discovered by a relative of his in 1847. He saw small quantities of it employed in making knife-handles and horse-whips. Being in the medical profession, he thought that gutta percha would make very good splints and bougies, and he sent portions of it to Bengal, and those specimens are now in the East India House : that was the beginning. He received the gold medal of the Society of Arts ; and the President of the India Board, at Mr. Crawford's request, had the kindness to confer upon his son a very handsome appointment in the service. From the returns of the Board of Trade, he saw that there had been imported of gutta percha, almost all from Borneo and Sumatra, not less than 23,000 cwt*s.* With the assistance of this gutta percha, we knew what we were able to do ; we shall be able, for example, to interchange conversation with our cousins across the Atlantic, in the course of a few months. There was another article of vegetable growth produced in Borneo that was curious enough—india-rubber, caoutchouc. Forty years ago, half a ton of india-rubber would serve Europe for ten years. The article was then used only for rubbing out pencil marks. The quantity now imported was 45,000 cwt*.* annually, and formed the raw material of a vast number of articles. The total value of it was 350,000*l.* Borneo produced sago, now become a considerable article. All these were things of modern discovery ; and he had no doubt that Lieutenant De Crespigny, in the course of his journeys, would be able to discover a great many more. He possessed qualifications that well fitted him for the task he had undertaken ; and he earnestly hoped, on the return of that gentleman, that they should be all present to hear his interesting papers read.

The PRESIDENT said Mr. Crawford had given a very interesting and instructive description of the country which Lieut. De Crespigny was about to explore. He was sure all would join with Mr. Crawford in his hearty wishes for his success. The Council of the Society had expressed its desire that day that the Admiralty should be moved to grant Mr. De Crespigny's request. They could only hope that the Government would promote his views in every way, as he was sure the Society, judging from the expression of the sentiments of those present, would be disposed to do. Before the President adjourned, he directed the attention of the Meeting to an application of one of the many valuable productions of Borneo, in the shape of the gutta percha forming part of the submarine cable about to be stretched between this country and America; and adverted to the admirable section upon the walls of the room, of that part of the Atlantic in which the cable would lie, as delineated by Mr. Cyrus Field, from the survey of Lieutenant Berryman, of the U.S. Navy.

Second Meeting, Nov. 24, 1856.

SIR RODERICK I. MURCHISON, VICE-PRESIDENT, in the Chair.

ELECTIONS.—*Captain E. A. Acheson; Dr. Phil. H. Barth; Lieutenant L. Brine, R.N.; Captain W. Brook; Captain E. Cooper; and Messrs. J. W. Childers; J. A. Beaumont; J. D. C. Ewing; G. M. Harrison; A. B. Hill; J. R. Langler; J. Palliser; H. S. Reid; J. M. Share, R.N.; E. H. Stanley; J. L. Statham; and James Vaughan, M.D., were elected Fellows.*

DONATIONS.—Among donations received since the previous meeting were 'Le Moniteur des Indes, Orientales et Occidentales,' 3 vols. 4to., presented by Mr. J. Crawford, F.R.G.S.; Redhouse's 'English and Turkish Dictionary,' presented by Mr. Quaritch; 'Treasury of Geography,' by Mr. Wm. Hughes, F.R.G.S.; 'Series of Twelve Views in the Black Sea and the Bosphorus,' by Commander Montagu O'Reilly, R.N., F.R.G.S.; Reports of Explorations and Surveys in the United States; the Transactions of the Smithsonian Institution of Washington, of the Boston Society of Natural History, the German Oriental Society, the Imperial Geological Society of Vienna; the Royal Institute of Dutch India, &c.

OBJECTS EXHIBITED.—Various articles, relics of Sir John Franklin's expedition, obtained from the Esquimaux at Repulse Bay by Dr. Rae; and others, sent home by Mr. Anderson, from Montreal Island, were exhibited through the kindness of Mr. Tonna, F.R.G.S., Secretary of the United Service Institution, and excited much interest.

ANNOUNCEMENTS.—The CHAIRMAN stated that the members would be aware that, at their last meeting, a resolution was unanimously passed, to express their deep regret that their distinguished medallist, Dr. Kane, was prevented by

illness from attending in person to receive those gratulations which they were all ready to offer him. The President of the Society, Admiral Beechey, who he regretted to say had been prevented by ill health from taking the chair, had requested him to state the gratification he had experienced in waiting upon Dr. Kane, and in expressing the feelings of admiration entertained by the Geographical Society towards that eminent traveller. The reply which Admiral Beechey received was as follows :—

Champion Hill, Camberwell, Nov. 16, 1856.

MY DEAR SIR,—May I avail myself of your kindness to convey to the Society over which you preside, my sense of the high honour which, in the form of a resolution of welcome, was this day conveyed to me by you in person.

I regret that my extreme illness compels me to devolve this grateful duty upon another hand, but I know that you will make the necessary explanations to the Society.

I am, my dear Sir, with great regard,

Your obedient servant,

E. K. KANE, U.S. Navy.

Rear-Admiral F. W. Beechey, President R.G.S.

It was only necessary on his part to explain that Dr. Kane had, by order of his physicians, already proceeded on a voyage to the Havanna, and to add that it was no doubt the hearty wish of every British geographer that this distinguished man might be soon restored to health.

He, the Chairman, had also to announce that, since the last meeting, the Admiralty had acceded to the wish expressed by the President—a favour not granted on ordinary occasions—that Lieut. De Crespigny, F.R.G.S., the adventurous young officer who had volunteered to survey in various directions the extensive island of Borneo, should be allowed to proceed on the proposed expedition. The Admiralty received, it appears, the proposition very favourably, and had not only granted leave to Lieut. De Crespigny, but also a free passage in H.M.S. 'Actæon.' Upon the application of another naval officer, they were so liberal that they also granted permission to him to accompany Lieut. De Crespigny. He mentioned this circumstance with great satisfaction, as it showed that the Admiralty were fully aware of the position in public estimation which the Royal Geographical Society justly occupied. In fact, all the departments of the Government seemed anxious to attend to the recommendations and wishes of this Society.

He might further announce that the wishes of the deputation which waited upon the Earl of Clarendon, to urge his Lordship to sanction an annual expedition to the Niger and Chadda, like that successful one under Dr. Baikie, in order to bring us into systematic communication with the people of that portion of Africa, had met with the entire concurrence of her Majesty's Foreign Secretary. He felt confident, from what he heard on that occasion, that the Government would carry out the wishes, which had been long entertained by geographers. These were very gratifying results, and he need scarcely say the Society was flourishing, seeing so many new members added to it at every meeting.

The papers read were :—

1. *Plan for a farther Search after the Remains of the Franklin Expedition.*

By Lieut. BEDFORD PIM, R.N., F.R.G.S.

LIEUT. PIM stated that as a decisive clue of the missing expedition had been obtained, in the shape of the relics purchased by Dr. Rae

from the Esquimaux during his survey of part of Boothia, it was natural to look for the solution of the mystery to the locality of King William Land. He ascribed the failure of the last expedition sent out by the Hudson Bay Company to follow up the traces of Franklin discovered by Dr. Rae, to various causes, but chiefly to the lateness of the period of the year when they started and to the absence of an interpreter; and denied the existence of any evidence proving that the party had perished, since no vestige of human remains had been found, which would otherwise have been the case. The scheme he proposed was, that a screw steamer, with a complement of twenty men, should penetrate as far down Peel Sound as possible, take up winter quarters, and, assisted by teams of dogs, purchased at the Danish settlements of Greenland, extend the search down both sides of the Sound. Another steamer should push through Behring Strait and winter at King William Land; and a third party should descend the Great Fish River. Lient. Pim particularly desired the use of small steamers, supplied with dogs for travelling purposes. Who could doubt that, had Sir John Franklin had the command of 20 men only, instead of 138, but he would have escaped from his icy prison as easily as Sir John Ross had done? The smaller number would enjoy abundance, while the larger number were perishing with hunger. The superiority of dogs over men for sledging purposes had, in Lieutenant Pim's opinion, been abundantly proved—frost being the most dreaded enemy of the men, whilst dogs are exposed to the severest inclemency of the weather with impunity. The most interesting locality for the search, was undoubtedly, King William Land; which, situated at the mouth of the Great Fish River, was, on account of its proximity to the magnetic pole, and the number of Esquimaux inhabiting its vicinity, who beyond a doubt were the depositaries of the Franklin secret, of the greatest importance. Having pointed out the field of search, Lieutenant Pim described the eastern road to it, or that by Lancaster Sound, as comparatively uncertain; while the western, or that through Behring Strait, he believed could be coasted by ships sooner or later in each year, along the northern shores of the American Continent. Captain Collinson had engaged to take a ship to Simpson Bay in ten months, and, indeed, had given it as his opinion to him, that he could take through the 'Marlborough,' the largest ship in the British navy.*

* Lieut. Pim exhibited the fac-simile of a Chart drawn by an Esquimaux, on board the 'Enterprise,' pointing out the locality of two ships; but which Capt. Collinson, at the time, supposed to refer to the 'Victory,' abandoned by Sir John Ross in 1831.—ED.

SIR RODERICK MURCHISON, F.R.G.S., was sure the members would return their thanks to Lieutenant Pim for his communication, inasmuch as they would recollect the efforts made by that officer in the search after our missing navigators. No one could forget the bold enterprise which Lieutenant Pim formerly projected, the vigorous manner in which he set about it, with the full determination to reach, by a land journey over the wilds of Siberia, those distant regions in which Franklin and his associates were supposed to be fast bound in ice. Lieutenant Pim's antecedents were indeed an earnest that what he now proposed was worthy of the serious consideration of the Society. He, the Chairman, had been alluded to as having been one of the individuals, who had zealously advocated a final search for the relics of the 'Erebus' and 'Terror.' He, certainly, did take a very deep interest in the memorial which he himself presented to the First Minister of the Crown upon this subject; and he must say, that this document, signed as it was by many men eminent in science, as well as by experienced Arctic explorers, met with the full and entire favour of Lord Palmerston, who paid a very marked attention to it. Though he, Sir Roderick, had no right to hold out any prospect upon authority, it might still be hoped that Her Majesty's Government would think it due to the honour of a great country like Britain, which had spent so many thousands of pounds in the search after Franklin, not to abandon a last effort to detect the relics of the ships, and probably to find the log-books, and such records of those six years' wanderings in the far-off Arctic regions, as might well be preserved in the ice, and might be found by a survey in a circumscribed area. The Society would recollect, that this proposed expedition differed entirely from all former efforts to discover the direction even, in which the bold and gallant Franklin had sailed. Through the discoveries of Dr. Rae, we now know that within a very limited space indeed, the ships and their relics must lie. Again, that the spot could be easily reached, had been set at rest by Captain Collinson, who in a sailing ship passed to within one hundred and fifty miles of the area to which he adverted, along the north coast of America, and returned unscathed and without the loss of a man. If a screw vessel were propelled in that same course, there could not be the remotest doubt that one portion of the proposed scheme might be accomplished. Not being a naval man himself, he did not pretend to enter into the relative merits of an expedition by the east or the west. These were points which might be considered hereafter; but he did sincerely hope that a last effort might be made for the honour of our country. Our neighbours, the French, as stated in the memorial alluded to, in the case of the unfortunate catastrophe that befell La Perouse, had set an example, which, for the credit of our country, we ought to imitate. The moment our allies procured the first information respecting that ill-starred expedition, they sent out a considerable force to collect every remnant and record connected with it. These they had justly hung up as trophies in Paris, and such conduct was well worthy of imitation by other nations. In the event of the Government declining to send out an expedition, he was authorized to state that Lady Franklin, who had already expended so much in fitting out expeditions in the search after the missing navigators, would, though there might now be no chance of finding a living man of the party, spend her last farthing in making this effort. He still hoped that the Government would give to that noble-minded woman every possible support, and furnish the expedition with provisions and instruments, and with a well-found vessel.

DR. RAE, F.R.G.S., said he had done, as no doubt others had when employed for the purpose, all he could to find traces of the missing expedition; but Lieut. Pim was perfectly right in saying that his discovery of relics in the region named was *unexpected*. He thought Sir John Franklin had gone in another direction; because on a former expedition Sir John had lost half his party in

travelling over a short extent of the American continent. He concluded that Sir John Franklin would have followed the route taken by Sir John Ross in escaping from Regent Inlet; and this opinion induced him to think that he was not to be found in the neighbourhood where relics had been met with. He did not think, with many other authorities, that documents were to be found. The documents, whatever they were, would have been carried to the point where the last survivors rested. That was his opinion. The Esquimaux told him that they had found eight or ten books where the dead bodies were; that those books had "markings" upon them, but they could not tell whether they were in print or manuscript. On being asked what they had done with them, they said they had given them to their children, who had torn them up as playthings. This was such an answer as the Esquimaux would scarcely have formed from mere invention; it was just what children would do in this country or anywhere else. But wherever the vessels were left, there it was barely possible that remnants of books might be found; still it was clear that those books could give no account of the fate of the party seen near the Fish River. There was only one point connected with the discoveries made by Mr. Anderson, which at first appeared to him inconclusive, and that was the not finding traces of bodies. Upon considering the subject, and consulting Sir George Back's book, he came to the conclusion that they had been washed away or covered up with mud. On the low ground where the party encamped, the tide flowed nearly over the whole of it, in gales of wind from certain directions. There was a large river flowing down, and all who have lived in the northern parts of America, know the effect of such a river filled with ice flowing over a flat tract of country; that it carried away remains of much greater resistance than any that mere bodies could offer. He might also refer to Captain Penny in confirmation of this view of the case. When Captain Penny wintered up Northumberland Inlet, he found that whales' carcases and bones, which he had left nearly high and dry the previous season, had been removed by a process he could not account for; there was not a bone to be seen. With respect to the expedition proposed by Lieutenant Pim, he wished it might be carried out, because he thought that the information obtained, *if any*, would confirm the statements he had himself brought home. He would not at present say exactly what his plans were, but he wished to complete the survey of the north coast of America, which he had twice endeavoured to accomplish. It was said that the third time was lucky, and he should probably try the third time.

MR. JOHN BROWN, F.R.G.S., wished to make an observation with reference to Peel Sound. He would caution geographers against the adoption of it as a Strait. It was not known to be a Strait. If they referred to the Blue Books they would find that Lieut. Browne, of Austin and Ommaney's expedition, went some distance down that Sound, and in his report pronounced it to all appearance "rarely if ever open for navigation;" in fact, he said, in parts it was frozen to the bottom. A little farther south, at Creswell Bay, by reference to Sir John Ross's trip down Prince Regent Inlet, they would find, looking west, a range of mountains—the Union Mountains—these must be some distance to the westward; they were very high; this again offered an obstacle to the supposition that Peel Sound was a strait. Again, farther south, at the western entrance of Bellot Strait, Capt. Kennedy and Bellot describe a "continuous barrier of land" from Cape Bird round to the north and west, forming a deep bay; this would shut out all idea then of Peel Sound being a strait. He would be sorry to see another failure by a search in that direction, after the many they had had. Probably the best place to put the ships would be down Prince Regent Inlet, but not so far south as to be locked up as Ross was,—say about Creswell Bay. But, after all, where, he would ask, did the party said to have perished at Montreal Island come from? He did not think

they came down Peel Sound at all; had they done so, we should have expected to have found traces of them from its vicinity to Fury Beach. He thought Franklin, in his endeavours to carry out his instructions, had attained large westing from Cape Walker, as far west as 105° or 110° , and had got entangled by the heavy ice in the deep bay of Melville Sound, and that he endeavoured to escape south by a strait which he (Mr. Brown) thought existed at the bottom of Melville Sound, between it and Gateshead Island, in King William Land. In 1854, he expressed to Captain Collinson, just then arrived, his opinion as regarded that particular part being a Strait. The heavy fixed ice on the eastern side of Melville Sound, found by Captain Ommaney and Captain Osborn, the currents and other reasons, too long to be entered upon then, had led him to that conclusion. Captain Collinson said, he "thought it probable, and yet the thought never occurred to him when he was on the spot." He mentioned this to prevent future failure. At any rate the fate of Franklin and his followers could not rest where it was, and he thought if they went down Prince Regent Inlet, and then crossed over as Kennedy and Bellot did, and in the direction he (Mr. Brown) had indicated, that they might obtain traces of the relics at least, of the long absent expedition. The way by Behring Strait was an excellent one, but he feared it took too long a time from England.

CAPTAIN MAGUIRE, R.N., said, he had been to Behring Strait four times, and as to the possibility of communicating with the mouth of Back River by the western route, he might state that he had been round Point Barrow three times, and he thought it was a navigation which might be undertaken without the slightest danger. Captain Collinson was of the same opinion. The advantages of the western route were threefold: 1st, the certainty of the ships arriving at the spot where the search has to be made; 2nd, in the event of any accident occurring to the vessel, the crew will be sure to reach the Hudson Bay settlements; 3rdly, that a travelling party (coming from the east) could not remain sufficiently long upon the spot so as to render the search complete and final. By this route, notice of the ship's progress can be conveyed by the Rat Indians from the Colville, and from Barter Island to Fort Youcon, and her safe arrival at her destination can be made known in England by the January following. Thus there would be no anxiety with regard to her safety. A vessel could get round by September; but by the eastern route it would be the spring following, before parties could reach there by travelling. This was a point of some importance, because information could not be got from the Esquimaux in a day or two. It took weeks, and it was very difficult to get correct information from them. By the western route, the passage from England to the mouth of Back River, could be undertaken with very little chance of stoppage. Captain Collinson had made the passage in one year, and Captain M'Clure in another, and they each could have got there by the month of September. A ship having arrived there, it would be very easy in the following spring, when the crews would not be employed about anything else, to try and find a way out by the eastward instead of returning as they went. But ships going in by the east, did not know how far they could get, and it was well known that Arctic travelling was a very laborious thing. People arriving at a place after a long journey, were not in a state to make a search with the same vigour they would exert if they were quite fresh.

SIR RODERICK MURCHISON said, it was interesting to find that the remarks made by Lieut. Pim had been confirmed by so experienced an Arctic navigator as Captain Maguire, whose observations were quite in unison with those of Captain Collinson—both of these officers who had "gone and done the thing." The public must therefore not imagine that the search that the memorialists and Lieut. Pim advocated, was attended by those dangers which were connected with former indefinite searches. With reference to the cha-

racter of the Esquimaux, among whom some of our people might have lost their lives, and some of our young men might be living, which was the opinion of Dr. Kane, he, Sir Roderick, hoped that the Bishop of Rupert Land, who was present, might afford them some information.

THE BISHOP OF RUPERT LAND said his knowledge of the Esquimaux was very small. He had encountered them in two directions in his own territory; at one extremity near James' Bay, and at the other above York Fort. He had seen and conversed with them from both these quarters, and he thought if the Government should sanction an expedition such as Lieut. Pim proposed, some endeavour might be made at the same time to form the nucleus of a settlement among them. That excellent body, the Moravians, would be inclined to do anything in their power, in affording interpreters or anything necessary, in order to secure intercourse with the Esquimaux. He was also most anxious to do all that might be necessary with a view to planting a missionary clergyman permanently amongst them. In intellectual power he did not think they came up to the Indians, but they were superior, he thought, in moral qualities. He was sorry he could not give more information respecting these interesting people: all that he knew of them was favourable as regarded their dispositions. He hoped something would be done for them, in a religious point of view, so that the present opportunity might not be lost. Should such be the result of an expedition sent out by Government, he for one would hail it, as conferring a lasting benefit on that neglected and interesting people.

LIEUT. PIM would like to impress upon the Society, especially, the necessity for having a ship at King William Land, because it would be most advantageous to winter close to the Esquimaux, so as to obtain a moral influence over them, and learn from them the precise whereabouts of our countrymen. If, for instance, a travelling party left a ship wintering at Batty Bay, where the 'Prince Albert' wintered, and travelled all the way down, by the time they arrived at King William Land they would be exhausted, and the Esquimaux could easily overpower them if they felt so inclined. At all events, as Captain Maguire said, time was essential to make the Esquimaux divulge all they knew. Sir Edward Parry was a whole winter in the ice (1820), before he obtained any geographical information from the tribes in his vicinity. Therefore he (Lieut. Pim) was anxious that a ship should actually winter at King William Land. Mr. Brown had said it was a very long way round by Behring Strait. All he (Lieut. Pim) could say in reply was, that the longest way round was often the shortest way there. After the vessel arrived at King William Land, by way of Behring Strait, there would still be four weeks' summer before them, to devote to securing the safety of the ship, and explorations in boats; whereas, by the eastern route, there would be only just time to prepare for winter. Captain Collinson in his letter asserted that a ship could go from England to Simpson Strait by the westerly route in ten months. The passage was performed by the 'Investigator' in 1850; and by the 'Enterprise' in 1851, 52, 53, 54. They might therefore take it for granted that the channel was open all the season, and Captain Collinson even went so far as to assert that if Government ordered him, he would take the 'Marlborough,' the largest ship in the service, safely up to Simpson Strait; therefore the Society need not feel any anxiety about the risk the explorers would have to go through. The greatest risk would be with the Esquimaux, and he thought they would be obliged to go among them with caution in endeavouring to ascertain from them all that they knew about Franklin. As regarded the bodies having been washed off a low spit of land, he certainly did not agree with Dr. Rae on that point, because the very liability of the ground to be washed by the rising of the river, must have been observed by Franklin's people, and would have prevented them encamping there, and com-

pelled them to take higher ground. He did not think they could attribute the fact of no vestiges being found to the nature of the ground. He (Lieut. Pim) stated this on his own experience, for having travelled after Dr. Rae's simple and excellent manner, without tents or superfluities of any sort, also after the tentative manner of a Government expedition, as well as making overland journeys, he might be considered a competent judge of causes and effects in the Arctic Regions.

DR. RAE observed that the Esquimaux travelled in sledges and encamped on low ground. He also always pitched on low ground, because the snow was best there for building. The Esquimaux did the same. He had been accustomed to the Esquimaux from Mackenzie River round to York Fort, a small space excepted, and had lived among them with perfect safety. He had left three of his people at Repulse Bay, and on his return he found twelve native families living with them. Some of these were relatives or acquaintances of the men who were supposed to have murdered Franklin's party. They were a gossiping people, not a quiet people like the Indian, and they would have told him at once if any of the party had been alive. If the party had got up the Back River, they would have been perfectly safe, because the native Indians would have fed them and brought them to the Hudson Bay posts. Lieut. Pim said he had travelled in the west, but travelling in the west could give no idea of travelling in the east. He (Dr. Rae) travelled there as the Esquimaux did, and encamped as they generally did in the low flat country. Every one agreed that they would rather encamp on low ground than haul their sledges through the snow to higher ground above the water-line. The party of whites, who starved near the Fish River, had travelled thither on the ice, not by water, because the natives followed the sledge marks on the ice, and the bodies were found before the ice broke up. He had gone over a considerable extent of coast, about 2000 miles, and consequently could speak from his own experience; but he would not venture to express any opinion of what Dr. Kane or Lieut. Pim had experienced 1000 miles or so to the north and west.

SIR RODERICK MURCHISON had no doubt every member of the Geographical Society was aware of the great merits of Dr. Rae's researches; and he was happy to have elicited from the Meeting a very general participation in the views of the gentlemen who signed the requisition to the Government, urging that another search, worthy of the country, ought to be made to discover the remnants of the Franklin expedition. He was also happy to hear that Dr. Rae himself intended to come forward, and he was not surprised at such an offer from so gallant and successful an Arctic traveller.

2. Dr. VOGEL on the Ivory-trade of Central Africa.

Communicated by the EARL of CLARENDON.

THE African ivory which reaches the Mediterranean ports comes chiefly from Adamawa and Alimshé, south of the river Chadda. From Bu-Mauda and Shubbún on the Chadda it passes northward through Jacoba to Kano, whence it is transmitted across the desert by Ghadamsi merchants. The quantity thus obtained is said to be 50 tons annually. Bornu and Wadai also contribute a small supply. Dr. Vogel found the people on the Chadda refusing to supply the usual buyers from the north, as Dr. Baikie's expedition up the Chadda had led them to hope for the arrival of English ships. Dr.

Vogel recommends small trading establishments to be formed at Bu-Mauda and Shubbún. Those markets are in healthy situations, well supplied with all kinds of food, and intercept the trade to the north. Regular periodical communication is essential, as the unexpected arrival of vessels might find the people unprepared to trade, and cause disappointment. A legitimate and active trade would soon spring up in those parts, and be preferred by the natives to dealing in slaves, a traffic which would then be abandoned.*

SIR RODERICK MURCHISON observed that in the early part of the evening allusion was made to the thanks of the Society to Dr. Kane for his expedition—an expedition which was more remarkable than any ever undertaken, inasmuch as it was done at the expense of two individuals of a kindred nation, or, as he might call them, our American brethren. That expedition having terminated, they had expressed their grateful thanks to those excellent Americans, who, in the search for Franklin, had distinguished themselves above all individual Englishmen. No one had acted the part of such pure philanthropists as Messrs. Grinnell and Peabody, both of whom, he was glad to say, were associated on the lists of the Royal Geographical Society.

He was happy to observe present, a gentleman who had taken part in the great survey across the Atlantic, for measuring the depths, and ascertaining the nature of the bottom of the sea, by which that gigantic scheme had been devised, which would unite the two nations in bonds, which he hoped never would be severed. Mr. Cyrus W. Field, the expositor, and in fact the promoter, of this great affair, was in the room, with some of the very materials with which the great connection was to be made. He thought he might call upon Mr. Cyrus Field to give a brief account of the remarkable manner in which the completion of the Atlantic telegraph was to be carried out.

3. *The Atlantic Telegraph.* By CYRUS W. FIELD, Esq., of the United States.

MR. CYRUS W. FIELD said, that the remarks which the Chairman had just made (alluding to some distinguished Americans) to men whom he was proud to call his friends, had struck a chord in his heart. The Americans, their brethren on the other side of the Atlantic, wished to get nearer to their fatherland. They were jealous of the earlier acquired knowledge of the English, and were determined to obtain it. When the Atlantic cable is laid, they will know in New York what is to be done in London, before it is even done there, the difference in time being five hours.

Mr. Field then said, if they would allow him, he would present a profile of the Atlantic Ocean between Newfoundland and Ireland, which was made by order of the United States Government, under the direction of that distinguished man, Lieutenant Maury, of the navy of the United States. The commander of the expedition was Captain Berryman, of the United States steamer 'Arctic.'

* According to the last accounts received by the Society from Dr. Vogel, dated Kuka, December 4, 1855, he intended then to visit Wadai, and afterwards to return to England early in 1857, by way of Adamawa, the Niger, and Fernando Po. Through H. M. Consul at Tripoli full supplies, both of money and articles of merchandise, had been sent to him.

The continuation of Dr. Vogel's important astronomical observations—the first portion of which were published in the 25th Journal of the Society—have not yet arrived.—ED.

Mr. Field here exhibited the profile of the Atlantic ; and the bed of the ocean was so level throughout the whole course, that, in making the Map, they had to exaggerate the vertical scale so that the depth appeared ten times greater than it actually was in proportion to the distances. The soundings were made according to the weather, not actually at so many miles apart, but as near as they could be made at stated distances. The deepest part was $2\frac{1}{2}$ miles, or 2070 fathoms. This is nearly in the centre. When the plateau was discovered by Lieutenant Maury, he denominated it the "telegraphic plateau." Mr. Field here exhibited a portion of the cable. It was estimated that communications could be transmitted through this cable, with the improved code, at the rate of 30,000 words in 24 hours. The line was completed from New York to St. John's, Newfoundland, a distance of 1710 miles as the line was laid ; and the president of that company had written to say that he had sent a message through it, and had received a reply within 15 minutes.

Mr. Field also exhibited specimens of the bottom of the Atlantic, brought up from over two miles in depth. There were no rocks to injure the cable, for the bottom of the ocean, throughout the whole distance, was composed of minute shells, so small that to the naked eye they appeared like sand, but when examined with a powerful microscope, they were seen to be most perfect in their formation. This plateau was evidently formed by the great Gulf-stream, which swept the Atlantic coast of the United States, and this being met by the cold currents from the north, the minute marine animals of tropical origin were probably killed, and their shells sunk to the bottom.

In conclusion, Mr. Field said he would only repeat an observation which he had made to a friend, that as on July 4th, 1776, the Americans had declared their independence of Great Britain, before July 4th, 1857, he hoped that they would again be annexed.

Third Meeting, Dec. 8, Session 1856-57.

SIR RODERICK I. MURCHISON, VICE-PRESIDENT, in the Chair.

ELECTIONS.—*The Hon. W. F. Campbell ; Rear-Admiral the Hon. J. Gordon ; Colonel Luke S. O'Connor ; Lord Oranmore ; Sir William Stuart, Bart. ; and Robert Benson, William Benson, Walter Bryant, J. George Cooke, and John Costerton, Esqrs. were elected Fellows.*

The CHAIRMAN read the following letter, addressed to the Secretary, from the brother of their late President, Rear-Admiral F. W. Beechey :—

8, Westbourne Crescent, Dec. 2, 1856.

SIR,—It is my painful duty to record the death of your President, my brother, Rear-Admiral Frederick William Beechey, on the 29th ultimo.

I remain, Sir,
Your obedient servant,
S. VINCENT BEECHEY, M.A.

The Secretary, Geographical Society.

SIR R. MURCHISON next read the following notice on the subject of Admiral Beechey's death :—

GENTLEMEN,—Before we proceed to transact the business of, this evening's meeting, it is my painful duty to advert to the great loss we have sustained since we last assembled, by the demise of our excellent and distinguished President.

On the last day of meeting, Admiral Beechey attended in the morning at these apartments, and, feeling himself indisposed, requested me to act for him. On the Saturday afternoon following, alas! he was no more!

It is not in my power to record at this moment (nor is this the fitting occasion) all the deeds and merits of that gallant, good, and eminent man. His conduct throughout a well spent life, will doubtless be done justice to at our next Anniversary, by whomever may then occupy this chair.

Let me however say, in deploring his loss, that, associated as I have been with the Royal Geographical Society since its foundation, it has never fallen to my lot to see it presided over by one who more honestly, efficiently, and successfully devoted himself to the promotion of its interests, than Admiral Beechey.

So strong was the habit implanted in him, of leaving no business unfinished with which he was concerned, that his very last official act within these walls, and when evidently struggling under the disease which carried him off, was to hand over to me his written suggestions respecting the proceedings of the Council and the evening meeting; requesting me at the same time to dwell specially, in any observations from the Chair, on the support which the Society was receiving from Her Majesty's Government, and particularly from the Admiralty.

In truth, I feel convinced that our lamented President accelerated his demise by the indefatigable performance of his public duties, at a time when a fatal disease was overpowering him. Since the sad event, I have heard it indeed from the lips of the Minister of the Crown, under whom he officiated at the Board of Trade, that his conduct in that department was, in all respects, so commendable, that it would be a task of extraordinary difficulty to replace so valuable a public servant.

We here have also tested his value, for we have seen with what good sense, and kind and courteous manners, our late President has kept us united in friendly bonds, and how, under his guidance, the Society has risen to a pitch of prosperity unexampled in its annals.

The following resolution was next proposed by Mr. W. J. Hamilton, seconded by Colonel W. H. Sykes, and unanimously carried:—

“That the Chairman be requested to express the deep sorrow of the Fellows of the Royal Geographical Society on the demise of their distinguished President, Rear-Admiral F. W. Beechey, and to communicate their sincere condolences to his widow and family.”

SIR RODERICK MURCHISON had now to announce from the Chair that it had pleased the Council, seeing the abeyance in which the office of President had fallen, for the first time since the Geographical Society had existed, to ask him to occupy the post. As that motion was passed unanimously, he would not shrink from his duty, provided the proposition met with the concurrence of the Society. But he must remind them that he was no longer what he had been. He was older than his departed friend, and it was not in the nature of things that he should carry out as vigorously and efficiently, as he did formerly, the duties thus imposed upon him. But, such as his powers might be, he could assure them that they would be devoted honestly, and, as far as practicable, exclusively to the interests of the Royal Geographical Society. He must at the same time say that it would be quite impossible for him to con-

tinue these duties beyond the ensuing Anniversary; and if it were the pleasure of the Society that he should occupy the office till that time, he would endeavour to support their interests now, as he had done formerly.

MR. W. J. HAMILTON, F.R.G.S., said, as a member of the Council, having been present when this subject, which was necessarily brought under their consideration, was discussed, he had great pleasure in rising to state that it was the unanimous wish of the Council of the Royal Geographical Society that Sir Roderick Murchison should undertake for the period he had mentioned, the duties which had hitherto been performed by their late lamented President. He begged leave, therefore, to propose that Sir Roderick Murchison do occupy the Chair of the Society until the ensuing Anniversary.

COLONEL SYKES, F.R.G.S., said that, if he had been present at the Meeting of the Council, he should have joined most readily in the proposition now submitted. The Society was under a great obligation to Sir Roderick Murchison for consenting to undertake the office, which was no sinecure, requiring, as it did, no ordinary ability, zeal, or leisure, to be carried out efficiently. He most heartily seconded the proposition.

SIR WALTER C. TREVELYAN, F.R.G.S., observed that, as the worthy Chairman could not put the resolution himself, he begged to do so, and hoped it would be unanimously adopted, "that Sir Roderick Murchison do occupy the office of President until the next Anniversary." The resolution was carried unanimously.

Dr. Livingston.—The Chairman then announced his regret at the non-arrival of their expected guest, the celebrated explorer of Africa, Dr. Livingston, owing to the breaking down of the Peninsular and Oriental steamer, 'Candia,' after leaving Malta. He hoped, however, to have an opportunity very shortly of presenting him to the Society.

Arrival of the Resolute.—The expected arrival of the 'Resolute,' under the command of the American Arctic explorer, Captain Hartstene, as a present to her Majesty from the United States Government, was then announced from the Chair, as having been communicated that day by his Excellency the American Minister, Mr. Dallas.

The papers read were:—

1. *On the Determination of the River "Eulaeus" of the Greek Historians.*
By WILLIAM KENNETT LOFTUS, Esq.

PROFESSOR LONG has remarked that the question as to the site of Susa is inseparable from that of its rivers. General Williams having made certain discoveries in the ruins of Shúsh, near Dizfúl, in Western Persia, in the following year the sum of 500*l.* was voted by Parliament, and, at the request of Colonel Rawlinson, Mr. Loftus undertook the excavations. The remains of two ancient palaces were uncovered. In the Journals of the Royal Geographical Society, the modern Kerkhah is correctly given as the Choaspes, the river of Diz as the Coprales, and the Kurán as the Pasitigris. Professor Long and Mr. Layard believe the Eulaeus to be the Shapúr, but Mr. Loftus considers that there was a bifurcation

of the modern Kerkhah ; one branch of which, passing on the east of Susa, eventually joined the Kurán below Bender-ghil. Thus the name Choaspes properly applied to the *western*, while that of Eulaeus referred to the *eastern* branch ; and the name "Eulaeus" was also given to the united streams and the Pasitigris.

SIR R. MURCHISON remarked that the subject was not new to them—at least, the geographical portion of it—for the volumes of the Society contained references to this river, on the part of Col. Chesney, Lieut. Selby, and others. He—Sir Roderick—had no decided opinion to offer upon a subject which involved so much classical learning ; but he would say that the paper—and this was the highest commendation he could give it—had met with the entire approbation of one of their most able comparative geographers, Col. Leake, and if he and Sir H. Rawlinson had been present, they would no doubt have spoken in the highest terms of its merits.

COL. SYKES, F.R.G.S., asked whether there was any appearance of such a physical alteration of the face of the country as might lead to the belief that the discrepancies, which existed between the present state of the country and the descriptions given of it by the Ancients, could be accounted for by any convulsions of nature, such, for instance, as earthquakes ? In that view of the subject there seemed some value in the study of comparative geography ; because, supposing these discrepancies to exist, we might infer that there must have been some great effort of nature to alter the courses of rivers and the forms of mountains. Thus there would appear to be a relation between comparative geography and geology.

MR. LOFTUS replied that there was no proof of any volcanic action ever having taken place in that region. He had been there four years, and never experienced any shock ; but there had been a change in the course of these rivers. The Tigris and Euphrates had changed their courses continually ; and it was the same with other rivers. The soil is alluvial, and as far up as Bussorah he found tertiary fossils—a species now existing in the Persian Gulf.

In answer to Colonel Sykes—

MR. LOFTUS said that Susa was 300 feet above the level of the sea, and that there are hills at the back ; also that there is a great fall in the river, and that at the lower part it is called "Kurán." Mr. Loftus pointed to the copies of inscriptions from Susa and also to the plans of the palace upon the table.

GENERAL MONTEITH, F.R.G.S., said it was so many years since he made a survey of these rivers, that he must make an apology for offering any observations upon the subject under discussion. Had the Society then existed, a vast deal of information, which was now lost, would certainly have been preserved. He passed from Mohammerah to Ahwaz, and thence to Shuster, taking a survey of the river with the best means in his power, and he was not deficient in instruments. In the neighbourhood of Ahwaz there was a bund, which was drawn across the river, for the purposes of both navigation and irrigation. There was a bed of an apparently large river passing round Ahwaz, which he was informed was the Kurán, turned off in that direction artificially, to enable the natives to build the bund. There was a bridge over it. After the bund was established, the river was again turned into its old channel. This apparent bed of the river was about 100 or 150 yards in breadth, and he was led to suppose that it was the bed of another river. At Shuster there was another bund, which was perhaps the greatest work executed at the present time. He thought there was a mistake in the late survey where a canal had been given for the bed of the river. The canal was crossed by a bridge of thirty-two arches, and

he was requested by the Persian authorities to offer any suggestion he could for the repair of this bund. He could only say that no engineer in Europe or elsewhere could have made a more beautiful work. The bunds were principally intended for irrigation. After leaving Shuster he proceeded to Ram-Hormuz, a distance of 90 miles, where there were signs of the bed of a river that came from the mountains which he crossed. On the other side of the mountains was an immense plain, extending, he might say, to Bagdad, which was crossed by two or three large rivers. But whether there had been any channels cut from these rivers he could not say. A river turned from its course for a short time would soon work for itself a new channel through the light soil of the country. Shuster never could have been a town of any importance; but the ruins of Susa, which he thought had been erroneously denied to be Susa, were 20 miles in circumference. It differed from every city that he had seen, by the streets being laid at perfectly right angles. There was one very large street, leading to the palace, which was an immense mound, little inferior to that of Babylon. In this was the reported tomb of Daniel. It was evidently an artificial mound, and well worthy of being opened; for greater discoveries might be met with in Susa, than in any other part of the world with which he was acquainted.

COLONEL SYKES said that General Monteith had offered a solution of difficulties which had caused a vast deal of discussion. The rivers having been turned from their beds in the shifting soil described, it would be difficult to determine where they had run before.

GENERAL MONTEITH observed that it was 70 miles, by the shortest route, from the river to Ram-Hormuz, across a desert, and it was 90 miles from Susa.

SIR R. MURCHISON stated that, with reference to these Eastern countries, Humboldt had called attention to the changes which had taken place in large rivers within the historical era. The Oxus, the largest of all these rivers, manifestly flowed into the Caspian Sea in the time of Herodotus. There was no doubt that the course of that river had been changed; but he would not pretend to decide, after what had been stated, whether this had been produced by natural causes, as Colonel Sykes suggested, or by the erection of bunds, as General Monteith had remarked. There were gentlemen present who could tell them that large rivers had been changed by the works of the natives.

COLONEL SYKES.—The Indus had apparently changed its course since the time of Alexander.

The PRESIDENT announced that the Secretary would read a short communication from Mr. Henry Poole, who was sent out by the Foreign Office to make a survey in the East for coal. He was not fortunate in finding coal of a good quality, and he was then directed to proceed to the Dead Sea in search of nitre. In searching the Dead Sea Mr. Poole fell in with some other phenomena, a short account of which would be given in the twenty-sixth volume of the Society's Journal :—

2. *Note on the Exploration of the Shores of the Dead Sea.* By MR. HENRY POOLE.

SIR,—As my letter to the Earl of Clarendon, containing a report of my journey in Asia Minor and on the shores of the Dead Sea, has been forwarded by his Lordship to the Society, I take the liberty of expressing a hope that farther inquiries may be made on the shores of the Dead Sea, and I would beg to draw your attention to several points which I consider require verification, viz. :—

1. Can the lebias found at Em Barghek and Ain Terabeh live in the Dead Sea?

2. Are the minnows in the Jordan, mentioned by Lynch, not also lebias?

3. Are the waters of the Dead Sea of different densities, as well as temperatures, at different depths, as well as at different localities?

4. What is the mean dew-point, force of vapour, and relative humidity on the shores of the Dead Sea?

5. What is the mean temperature, as well as amount of radiation?

6. What is the mean height of barometer and boiling-point of water? Lynch gives the latter as 215° .

7. What do the wild-fowl feed upon which dive in the Dead Sea?

8. What causes the phosphorescence observed by Lynch in the Dead Sea?

9. What is the difference of sea-level at different seasons of the year, and will the evaporation compensate for the volume of water flowing into the Dead Sea?

10. I would also call your attention to the close approximation made with the Aneroid Métallique, when corrected by Delcros's formula for temperature and latitude, as shown in the accompanying table of heights of mountains in Westmoreland:—

Names of Mountains.	Heights per Aneroid in feet, by H. Poole.	Col. James, Ordnance Survey.	Difference.
Helvellyn	3056	3117	- 61
Fairfield	2837	2861	- 24
Highstreet	2693	2722	- 29
Wansfell*	1649	1598	+51
Kirkstone Pass	1487	1466	+21
Ewe Crag, Loughrigg Fell	1123	1101	+22

It would thus appear that this very portable instrument may be advantageously employed for topographical surveying by using a proper formula for corrections.

If any further inquiries were made on the shores of the Dead Sea, it would be a good opportunity to carry a series of aneroid levellings through the valley of Acabá to the Red Sea; for in none of the above six heights is there near so much difference as is recorded between the barometrical altitudes of different places in Syria.

I found the temperature of the Dead Sea, in the month of October, about 82° Fahrenheit near the surface. The temperature of air

* I was not quite at the summit of Wansfell, which I assumed to be 30 feet above me, but it may not have been quite so much.

during the day from 90° to 100° , and at night about 80° . By the imperfect mode of wetting the bulb of the thermometer, the dew-point was far below the extreme cases calculated in psychometrical tables. The evaporation was rapid, and the dryness very great, on the shores of the Dead Sea. My aneroid (I had no other barometer) showed a pressure of 31.50 inches and upwards, which is higher than the ordinary barometers are graduated to read.

The small fish which I caught close to the shore of the Dead Sea, in a brine spring flowing into that sea near Usdum Mountain, at a temperature of 90° , and presented to the British Museum, have been named by Sir John Richardson, to whom they were submitted, as "*Lebias*," or *Cyprinodon Hammonis* of Cuvier, and which had been previously found in the Red Sea. He considers it would be of great interest to prove the fact if these fish live in the Dead Sea. At the time when I caught them, I believed them to be the young fry, and not full-grown fish, and therefore I kept all I caught, and never thought of putting any into the Dead Sea to see if they would swim in it. Similar, but larger, fish (about three inches long) were afterwards seen, but not caught, at Ain Terabeh, near the north end of the Dead Sea. The fish called minnows, caught by Lieut. Lynch in the Jordan, may also belong to the same class. If so, may not these fish have come down with the floods of spring, when the waters of the Sea would be less salt, and thus have been able to pass to the south end of the Sea, even supposing that they could not live in it at other periods of the year?

Lieut. Lynch states that the water is at an uniform temperature of 59° at a depth of 10 fathoms, while he found the surface temperature to average 76° . It would therefore be of great interest to obtain the specific gravities, as well as temperatures, of that Sea at different depths.

I observed three different kinds of wild-fowl swimming and diving in the Dead Sea, evidently feeding, and it would be of importance if some could be shot at such a time, so as to examine their crops and see the nature of their food. In theory, it would be as difficult for ducks to dive as fishes to swim in the Dead Sea, and therefore that objection must now fall to the ground.

Lieut. Lynch speaks of a phosphorescent appearance in the Sea, but I did not observe any: if water were obtained at such a time, it should contain animalcules.

The difference in the surface-level of the Dead Sea should also be noted at different seasons of the year.

As I have lately seen the report of some most interesting meteorological observations having been made at a considerable height

at Teneriffe, I have thought if similar observations could be made on the shore of the Dead Sea (which is upwards of 1300 feet below the level of the Mediterranean), they would considerably enlarge the scale of observations; and data could be obtained to that depth for proving or correcting, in a descending scale, the formula respecting radiation, specific gravity, and other subjects of observation recorded by Professor Piazzi Smyth.

The PRESIDENT called attention to one or two points in the memoir, particularly to the one with respect to the species of fish mentioned—a remarkable little fish, which Mr. Poole had caught in a marshy spot on the shore of the Dead Sea. It had been submitted to Sir John Richardson, whom everybody knew was a high authority on ichthyology, and he had determined that it was a species which existed in the Red Sea, and also in all the fresh waters of Syria. The question of establishing a communication between the Mediterranean and the Red Sea was thus once more brought before them, and this little fish seemed to confirm the theory that there had formerly been a communication.

SIR JOHN RICHARDSON said the fish in question was described by Rüppell, and was known to Cuvier. It was a species of Cyprinodon, and was at one time confounded with the carps. He did not know how far the fish would go to prove the theory alluded to by the President. This species, now known as the *Cyprinodon Hammonis*, was first discovered in the oasis of Jupiter Ammon. It exists all over Syria in almost every pool, and Mr. Poole found it on the supposed site of Sodom, close to the Dead Sea, within a few feet of the shore, where the sea at certain times rose. Mr. Poole at first thought it came out of the Dead Sea; but it was found in a marsh fed by a salt spring. He had deposited specimens of the water of that salt spring, and also of the marsh in which he found the fish, in the Museum of Practical Geology; and if that office were to ascertain the specific gravity of these specimens, they might at once determine whether the water of the marsh approached to the Dead Sea in the quantity of salt it contained.* It was a fish which lived both in fresh and salt water, and it was abundantly found in the Red Sea. With respect to the ducks seen by Mr. Poole in the Dead Sea, it did not appear that he had shot any, or he would, probably, have found what they were feeding upon. It was an old notion that birds could not fly over the Dead Sea; but Mr. Poole had shown that they could not only fly over it, but live upon it.

In reply to Colonel Sykes, SIR JOHN RICHARDSON said that the specific gravity of the Dead Sea had been determined; it was about 1·227 to distilled water at 1·000.

* Museum of Practical Geology, Jermyn-street.

Copy of a Note from Dr. Hofmann to Sir Roderick Murchison.

No. 1. Brine spring near Usdum with Fish. Temp.

90° Fahr., Spec. Grav. 1·035.

No. 2. North end of Dead Sea, near Jordan. Temp.

83° Fahr., Spec. Grav. 1·196.

No. 3. Dead Sea, Usdum, South end. Temp. 83°

Fahr., Spec. Grav. 1·204.

No. 4. Peninsula, El Lisan, North end, Spec. Grav.

1·200.

} Mean of Dead Sea at surface, Spec. Grav. 1·200.

According to Lynch—The specific gravity of the Dead Sea, at a temperature of 60° Fahr., and at a depth of 185 fathoms, is 1·2274, and that of the River Jordan is 1·00183.

The PRESIDENT stated that he had received a communication from Mr. Wilson, geologist of the North Australian expedition. A large portion of the letter related to details not absolutely connected with the Physical Geography of the region, but with the arrangements of the expedition. Mr. Wilson had, however, made an exploration of some importance in the neighbourhood, and had sent home a tracing of this part, which might be seen in the map-room. There were moreover some geological details in the communication, and those portions of the paper which related to the geography of the district would be printed in the "Proceedings" of the Society. Owing to the lateness of the hour, he would only direct the title of the paper to be read.

3. *Extracts from Notes on the North Australian Expedition.** By
MR. J. S. WILSON.

Communicated by Sir RODERICK I. MURCHISON.

Victoria River, July 11, 1856.

DEAR SIR,—As I am to accompany the vessel to Timor, I shall take the opportunity to convey to you a concise account of the North Australian expedition since its arrival at Point Pearce. The horses were landed and encamped at a swamp by Mount Providence, and the sheep were put on board the schooner. Mr. Gregory arranged that himself and brother, accompanied by Dr. Müller, our botanist, and six men, should proceed with the horses round the head of the Fitzmaurice, across the Macadam and Sea Ranges, to Kangaroo Point on the Victoria River, while I was to take charge of the vessel, proceed up the river, and encamp where I should find it most suitable, at or above Kangaroo Point. I was accompanied by Mr. Elsey, surgeon and naturalist; Mr. Baines, artist and store-keeper; Mr. Flood, collector of natural history; and four men. We left Treachery Bay on the 25th of September, and got on well till we came to the shoals in front of the Musquito Flats; and here, through not knowing the passage sufficiently, the vessel grounded at high-water and high spring-tide, and could not be got off. The great danger at this place, in going up the river, results from the singular fact that the tide falls a foot to eighteen inches, while there is still a strong current running upward. This arises from the distance which the tide flows upward, as it does not reach the end of its course before the ebb has commenced at the mouth of the river. A vessel, therefore, going up the river, and grounding on one of these banks, cannot be got off until a higher tide carries her right over the bank. The spring-tides were declining at the time we thus got fixed, and we were within 12 miles of Kangaroo Point, but the river nearly all that distance is choked with sandbanks. There was only one cask of water on board for the sheep and people. I had

* See Proceedings R. G. S., No. I., pp. 5, 10: No. II., pp. 31, 32, 33, 49.—ED.

already succeeded in finding a creek, with an abundance of water in pools; but we were then 3 miles past the place, and the nearest pool was half a mile from the river-side. I might have sent the sheep there, but my party was too weak to be divided between two camps and the vessel, the latter requiring all the assistance that could be afforded. The allowance of water to the sheep was stopped until more could be obtained, and we had but ten days to have a camp selected and ready to receive Mr. Gregory and party. To meet both these ends, I organized a party to proceed up the river to Steep Head, or such other place where we might find fresh water, and, at the same time, to look out the most convenient place for a camp. We had an India-rubber double boat, composed of four large air-tight bags; these we proposed to fill with fresh-water and tow them down the river. My party included Mr. Elsey, Mr. Baines, and two sailors. With the exception of a spring between Sandy Island and Steep Head, we found no fresh-water until we reached Palm Island, which we did with considerable difficulty, having to haul the boat over the stony shoals at Steep Head. On the evening of the sixth day, we got back to the vessel, and, on the following morning, the water was got on board, amounting to upwards of 500 gallons. On the morning of the 8th of October, I started, with Mr. Elsey and a sailor, in the small boat, to determine the place for our camp. I examined the slope of Sea Range for a distance of about 5 miles in a fruitless search for water, then returned to the boat and proceeded up the river after sundown, and reached a stony spit within a mile of Sandy Island, and stopped there the remainder of the night. In the morning we hurried up to where we had found the springs, dug two wells that promised an abundant supply, filled a small cask, and hurried to get back to the vessel. On our way back, we remembered indications of a large creek running eastward in front of Sea Range, and determined to look into it more particularly as we passed down. As we did so, we were astonished to find a river broad and deep enough to warrant our anticipating its having a long course. Being of a nature to turn Mr. Gregory out of the line he should follow, and delay him on his way to the camp, I ran the boat up its circuitous course till we were 6 miles in a straight line from the entrance; here we were stopped by a flat ledge of rock, over which the water was too shallow to pass with the boat except at high tide. Leaving the man in charge of the boat, we started on foot to trace the river up to a place where it might be supposed the horses would cross, and where they might find fresh water. We effected this at a distance of about 6 or 7 miles, where I marked some trees, and left a notice for Mr. Gregory, informing him

where to find the camp. We then returned with all haste, and reached the schooner by noon on the next day. It was my intention to have sent a boat on the next day, with some of the sheep and a party to encamp at the springs, but the night-tide rose high and carried the vessel nearly over the bank, and there was a prospect of getting her off next tide, to effect which the help of all hands might be required. Having failed in this, I despatched a boat on the morning of the 14th, putting on board twenty sheep and some provisions, and appointing Mr. Elsey, with two men, to take charge of the camp, and Mr. Baines and Mr. Flood to return with the boat for another load. The boat returned on the 16th, and started again on the 17th with eighteen more sheep. Unfortunately they grounded on a bank near the Dome, and being delayed there nearly two days, some of the sheep died. They arrived at the camp, however, a few minutes after Mr. Gregory had been taken across the river to it in the dingy. Meanwhile, as I endeavoured to remove the sheep to the camp, the fate of the vessel became most critical. Being laid across the stream, the current washed away the sand from under both ends, leaving her supported only in the middle. The result was, the keelson, some of the floor-timbers, and two of the beams were broken, and there was every probability of her parting in two had she remained in that position much longer; but when the tide rose we succeeded in getting her shifted a little ahead into the hollow that had been washed out there. We soon after discovered that there were four feet depth of water in the hold, and it required the pumps to be kept at work all the time the tide was up to keep the water below that mark. During the time of low tide some of the principal leaks were found, and temporarily stopped. The spring-tides were increasing, with which we expected to get off. The boat sent to the camp being absent two days beyond the calculated time, much uneasiness was felt in consequence, and another boat was being prepared to send to the camp, when the former appeared with Mr. Gregory on board. Mr. Gregory informed us that his party had gone round by Steep Head to come to the camp. On the 24th of October the vessel was got off, but settled again on another bank near Alligator Point. I was next day sent ashore with the remaining sheep to be kept at water behind the Dome, which Mr. Gregory had found when passing there with the horses; Dr. Müller and two men were sent with me. The vessel was got off, and anchored opposite the camp on the 28th, and on the 30th two boats * arrived to take the sheep and party

* Through the leakiness of one of these boats we lost 11 sheep.

under my charge to the camp. On the day after my arrival at the camp, I was appointed to superintend the arrangement of the stores, and to inspect and cooper the damaged provisions.

After an unsuccessful endeavour to pursue the ascent of the river in boats, on the 24th of November, the Messrs. Gregory, Dr. Müller, and myself, with four riding horses and three with packs, left the camp on a preliminary journey, taking provisions for three weeks. We proceeded along the river to Timber Creek (so called from having found timber there to repair the schooner), and travelled along the creek upward, the course being generally south. The first 7 or 8 miles was through a beautiful valley, principally of a rich alluvial soil, covered with a dense growth of long grass and thinly timbered. The sandstone hills, rising abruptly on each side, were, in many places, picturesque. In the upper part of the valley cherty limestone rocks came to the surface in a broken state, which rendered travelling very difficult for the horses; 18 miles up this creek brought us to a dividing ridge 500 feet above the level of the sea. We were disappointed at not being able to see a range of hills southward. A range to the eastward rose high and distinctly, and seemed to strike toward the river. We travelled eastward, down a creek, until we found water, then struck off, in a N.E. course, along Beagle Valley and parallel with the range, which we supposed to be Fitzroy Range, until we came to the river at Emu Plains. There was abundance of grass, and the greater portion of the soil in the valley was excellent. From the last point we took an easterly course, leaving a range of hills between us and the river, which, however, we struck again after five hours' travelling. The river continued eastward for 7 miles more, and then turned to the S., all the way passing along a narrow valley, enclosed between walls of sandstone, but, after being followed 20 miles southward, it opened into a large plain. Being then on the W. side of the river, we were led off by a branch that came from the S.W. We followed it several miles, and then struck off to a range of hills from which apparently this river came. We ascended a hill at the eastern end of the range. After taking a hasty glance at the country beyond, I took advantage of the opportunity to examine the jasper rock forming the top of the hill. While thus employed, Mr. Gregory drew my attention to the ranges which struck off to the westward, and seemed to enclose the plains at a distance between 20 and 30 miles. I had maintained an opinion that the stream we had lately been tracing, was not the main body of the Victoria. Looking as he now desired me, I said the Victoria was certainly cut off in that direction; but, turning to the eastward, I said it would be found

there yet. Mr. Gregory, however, was doubtful; he therefore left Jasper Range, with the intention of returning to the camp; but, as we descended to the lower side of the plains, he took the eastern side of Jasper Creek, and from the top of a little trap hill we could see a long belt of river-trees to the eastward stretching away S. Continuing our course, at little more than a mile from the place where we had left the main channel, we struck it again, broad, deep, and apparently undiminished. We halted there for the night, and on the next morning we followed up the river for nearly 30 miles, in a course a little E. of S., where it divided into two large branches. The rains had already commenced; there was an abundance of young grass springing up, and we returned to prepare for the journey to the interior. We traced our way back along the river, and arrived at the camp on the 13th of December, after an absence of twenty days.

Mr. Gregory calculating on being five months away, left the camp on the 3rd of January under my charge, taking with him Mr. H. Gregory, Dr. Müller, Mr. Baines, Mr. Flood, four stockmen, and all the horses, amounting to thirty-six.

During Mr. Gregory's absence I ran the boat up Saunders Creek for 6 miles, and went from thence on foot, accompanied by one man, to the east end of Sea Range, which I ascended for the purpose of getting a view of the valley beyond, from which the principal branch of the creek descends, and of the ranges on each side.

On the return of the expedition from the interior, as the preparations for the journey to the Gulf of Carpentaria were likely to occupy a month, I requested Mr. Gregory to permit me to occupy a portion of that time in obtaining a more extended knowledge of the geography and geology of the country east and west from the camp, as my duties in attending to the camp and the schooner had prevented my doing so to the extent I had intended. Accompanied by Messrs. Elsey and Müller, and with provisions for ten days, we took the gig, with two men, down the river to where the schooner lay. Putting some articles wanted at the camp on board the boat, I sent it back, and then, taking the dingy or jolly-boat, we proceeded up the western branch for 22 geographical miles, when further progress was interrupted by a rocky ledge. A sandstone range, exceeding 800 feet in height, ran parallel with the river on the north-west side. A detached hill, about 9 miles distant, being the farthest point of the range visible, I determined to go there and obtain a view of the country beyond. Accordingly, I left my two companions with the boat, and went alone to the hill, to which I gave the name of "Mount Victoria." From this hill I had a view

of the river, 10 miles beyond, which enabled me to lay down its course for a distance of 40 miles, and its probable course full 20 miles farther in the same general direction. I could also see the Newcastle Range, extending unbroken until the view was cut off by a projection of the Murchison Range. I hurried back to my companions, and by walking at intervals during the night, though travelling was very difficult, I reached the boat after twenty hours' absence. We returned to the camp on the 28th of May, having been just ten days away.

The table-land over which Leichhardt passed at the heads of the Roper and South Alligator rivers, I feel satisfied is similar, in every respect, to the table-lands of the Victoria, and is, in fact, the eastern extremity of the same continuous and extensive sandstone formation. He gives an estimate of its elevation in his journal on the 17th of November, when he says, "We stood, with our whole train, on the brink of a deep precipice, of perhaps 1800 feet descent." This I suspect to be a typographical error; what he wrote may have been 800 to 1000 feet, which would correspond very well with the ranges of the Victoria. Capt. Stokes remarks (Vol. II. page 141), that he was forcibly struck with the resemblance between Moresby's Range on the west coast, $28^{\circ} 50'$ S., Sea Range at the Victoria, Cape Flattery on the north-east coast, 15° S.; and he adds Flinders' description of the coast-range at the head of the Australian bight. They exhibit great similarity in elevation, all being between 500 and 700 feet; and I may add my conviction that the table-land of the South Alligator is no more than 800 to 1000 feet, or corresponding to that of the Upper Victoria. Mr. Gregory found it as difficult to descend from Sea Range as Leichhardt did from the ranges of the South Alligator.

On the 21st of June, Mr. Gregory started on his journey to the Albert, taking with him, besides his brother, Dr. Müller, Mr. Elsey, and three stockmen. The schooner was ordered to be taken to Timor, to get a supply of fresh provisions for the ship's people, and, if possible, to leave the sick in hospital before sailing to the Gulf. Mr. Baines is in command of the expedition people on board, and takes with him Mr. Flood, myself, and seven men, with instructions to assist in taking the vessel there.

After Mr. Gregory and party left, ten days were necessary to take the camp-fittings, &c., down the river to the schooner. Finding myself unoccupied for that time, I determined to extend my investigations, and started next morning alone and on foot to go to Duke Mount. Two objects I had in view were, first to discover the source from whence a recent but extensive calcareous formation in

the lower side of the plains was derived; and next, to obtain a more extended view of the plains westward, in both of which I was successful. In approaching Duke Mount, I saw a hill that projected farther into the plains a few miles distant. This hill I ascended, and was then enabled to see the extreme western end of Murchison Range, adding thereby 25 miles to my previous views on that side of the plains. I was also enabled to trace to a considerable extent a branch of the western river which Mr. Baines had seen, but did not follow; I have given the name of "Baines" to that branch, but the river itself I claim as my own discovery, and have named it.

The western end of the Murchison Range terminates in extensive plains. The most prominent hill in front of the range I have named "Mount Victoria;" it is not of itself worthy of such distinction, but the circumstance of my having ascended it on the anniversary of her Majesty's birthday, and obtained my most distant view of a western branch of the river that bears her Majesty's name, induced me so to name it. I enclose the leaf from my note-book on which I drew a sketch of the hill, when about one mile distant on the E. side. The Newcastle Range extends much farther than I have laid it down, and the Ellesmere Range I suppose to join the table-land to the eastward. The river Fitzmaurice most probably has its source in this range.

Arctic Squadron.—CAPTAIN SHERARD OSBORN next informed the Meeting that he had heard a few days since that Captain Penny, who wintered in Northumberland Sound last year, had received information which corroborated the intelligence brought home by Dr. Rae. Whalers generally kept dark the places they wintered in, as it was a question of money, but he knew pretty well where Captain Penny wintered, and he naturally inquired how, at that distance from where Dr. Rae obtained intelligence of the missing ships, he could have acquired his information. It puzzled him very much; the more so as Captain Penny spoke of the wreck of a ship. It struck him, however, that what Captain Penny had heard of, was the wreck of one of our deserted ships. He followed up the evidence as far as he could, and wrote to Captain Cator, R.N., who had commanded a vessel in an Arctic voyage, and who was now the conservator of the Humber at Hull, and consequently well acquainted with the captains of whaling vessels. He sent to him a series of questions, and asked him to procure answers. Through these inquiries he traced out what he believed was a fact—that two more of the abandoned ships had reached the shores of Davis Strait. Captain Penny observed that the Esquimaux had a great deal of ship-wood and treenails. After some trouble he found out that there were two ships near them, and that they were breaking them up and getting the wood out.

The Resolute.—The PRESIDENT next called attention to the fact that in a very short time they might expect the arrival in this country of their old ship the 'Resolute,' as purchased, fitted out, and sent home to us by the American Government. It was very desirable that all parties, who felt as lively an interest as he did in the subject, should testify their deep sense of this act of courtesy on the part of the American Government.

ERRATUM IN No. IV.

At page 97, insert, in the List of Memorialists, the name of *General Ed. Sabine*, which had been *accidentally* omitted.

ERRATUM IN No. V.

At page 173, last line but six, for "*visited*," read "*named*."

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1856-7.

Fourth Meeting (Special), Dec. 15, 1856.

The PRESIDENT, Sir RODERICK I. MURCHISON, in the Chair.

In opening the Meeting, the Chairman said,—

GENTLEMEN,—We are now specially assembled to welcome Dr. Livingston, on returning from Southern Africa to his native country after an absence of sixteen years, during which, while endeavouring to spread the blessings of Christianity through lands never before trodden by the foot of a British subject, he has made discoveries of incalculable importance, which have justly won for him, our Victoria or Patron's Medal.

When that honour was conferred in May, 1855, for traversing South Africa from the Cape of Good Hope by Lake Ngami and Linyanti to Loanda on the west coast, the Earl of Ellesmere, then our President, spoke with eloquence of the “scientific precision, with which the unarmed and unassisted English Missionary had left his mark on so many important stations of regions, hitherto blank.”

If for that wonderful journey, Dr. Livingston was justly recompensed with the highest distinction we could bestow, what must be our estimate of his prowess, now that he has re-traversed the vast regions, which he first opened out to our knowledge? Nay, more; that, after reaching his old starting point at Linyanti in the interior, he has followed the Zambesi, or continuation of the Leambye river, to its mouths on the shores of the Indian Ocean, passing through the eastern Portuguese settlements to Quilimane,—thus completing the entire journey across South Africa. In short, it has been calculate that, putting together his various journeys, Dr. Livingston has not travelled over less than eleven thousand miles of African ground.

Then, how does he come back to us? Not merely like the far-roaming and enterprising French missionaries, Huc and Gabet, who, though threading through China with marvellous skill, and contri-

buting much to our knowledge of the habits of the people, have scarcely made any addition to the science of physical geography ; but as the pioneer of sound knowledge, who, by astronomical observations, has determined the site of numerous places, hills, rivers, and lakes, nearly all hitherto unknown to us.

In obtaining these results, Dr. Livingston has farther seized upon every opportunity of describing to us the physical features, climatology, and geological structure of the countries he has explored, and has made known their natural productions, including vast breadths of sugar-cane and vine-producing lands. Pointing out many new sources of commerce, as yet unknown to the enterprise of the British merchant, he gives us a clear insight into the language, manners, and habits of numerous tribes, and explains to us the different diseases of the people, demonstrating how their maladies vary with different conditions of physical geography and atmospheric causes.

Let me also say that he has realised, by positive research, that which was necessarily a bare hypothesis, and has proved the interior of Southern Africa to be a plateau traversed by a network of lakes and rivers, the waters of which, deflected in various directions by slight elevations, escape to the eastern and western oceans, by passing through deep rents in the hilly, flanking tracts. He teaches us that these last high grounds, differing essentially from the elevated central region, as well as from the rich alluvial deltas of the coasts, are really salubrious, or, to use his own language, are perfect *sanatoria*.

I have thus alluded, in the briefest manner, to the leading additions to our knowledge, which have been brought before you by Dr. Livingston. The reading of the last letters, addressed to myself, was, by the direction of my lamented predecessor, Admiral Beechey, deferred until the arrival of the great traveller ; in order that the just curiosity of my associates might be gratified by having it in their power to interrogate him upon subjects of such deep importance ; and, above all, that we might commit no mistakes in hastily constructing maps from immature data ; certain sketch maps having been sent to us, before it was possible to calculate his observations and reduce them to order.

Passing then from this meagre outline of the results to science, what must be our feelings as men, when we mark the fidelity with which Dr. Livingston kept his promise to the natives who, having accompanied him to St. Paul de Loando, were reconducted by him from that city to their homes ? On this head my predecessors and myself have not failed, whenever an opportunity occurred, to testify our deep respect for such noble conduct. Rare fortitude and virtue

must our Medallist have possessed, when—having struggled at the imminent risk of life through such obstacles, and escaping from the interior, he had been received with true kindness by our old allies the Portuguese at Angola—he nobly resolved to redeem his promise, and retrace his steps to the interior of the vast continent. How much, indeed, must the moral influence of the British name be enhanced throughout Africa, where it has been promulgated that our missionary has thus kept his plighted word to the poor natives who faithfully stood by him!

Turning to Dr. Livingston, the PRESIDENT then said—Dr. Livingston, it is now my pleasing duty to present to you this our Patron's or Victoria Medal, as a testimony of our highest esteem. I rejoice to see on this occasion, such a numerous assemblage of geographers and distinguished persons, and that our Meeting is attended by the Ministers of foreign nations.* Above all, I rejoice to welcome the Representative of that nation whose governors and subjects, in the distant regions of Africa, have treated you as a brother, and without whose aid many of your most important results could not have been achieved. Gladdened must be the hearts of all the geographers present, when they see you attended by men, who accompanied and aided you in your earliest labours. I allude particularly to our own Fellows, Colonel Steele, Mr. Cotton Oswell, and Captain Vardon, who are now with us. As these and other distinguished African travellers are in this room, and among them Dr. Barth, who alone of living men, has reached Timbuctu and returned, may not the Geographical Society be proud of such achievements? I therefore, heartily congratulate you, Sir, on being surrounded by men, who certainly are the best judges of your merits, and I present to you this Medal, as a testimony of the high admiration with which we all regard your great labours.

DR. LIVINGSTON replied:—Sir, I have spoken so little in my own tongue for the last sixteen years, and so much in strange languages, that you must kindly bear with my imperfections in the way of speech-making. I beg to return my warmest thanks for the distinguished honour you have now conferred upon me, and also for the kind and encouraging expressions with which the gift of the Gold Medal has been accompanied. As a Christian missionary, I only did my duty, in attempting to open up part of southern inter-tropical Africa to the sympathy of Christendom; and I am very much gratified by finding in the interest, which you and many others express, a pledge that the true negro family, whose country I traversed, will

* The Ministers of Russia and Sardinia were also present.

yet become a part of the general community of nations. The English Government and the English people, have done more for Central Africa than any other, in the way of suppressing that traffic, which has proved a blight to both commerce and friendly intercourse. May I hope that the path which I have lately opened into the interior, will never be shut; and that in addition to the repression of the slave trade, there will be fresh efforts made for the development of the internal resources of the country? Success in this, and the spread of Christianity, alone will render the present success of our cruisers in repression, complete and permanent. I cannot pretend to a single note of triumph. A man may boast when he is pulling off his armour, but I am just putting mine on; and while feeling deeply grateful for the high opinion you have formed of me, I fear that you have rated me above my deserts, and that my future may not come up to the expectation of the present. Some of the Fellows of your Society—Colonel Steele, Captain Vardon, and Mr. Oswell, for instance—could, either of them, have effected all that I have done. You are thus not in want of capable agents. I am, nevertheless, too thankful now, that they have left it to me to do. I again thank you for the Medal, and hope it will go down in my family as an heirloom worth keeping.

THE RIGHT HON. H. LABOUCHERE, M.P., Her Majesty's Secretary of State for the Colonies, then said,—Sir Roderick Murchison, I thought it a great privilege to be allowed to attend to-night upon your invitation; and certainly with little expectation that I should be called upon to address you on this interesting occasion. I am happy to say, however, that the Resolution which has been put into my hands, and which I have been requested to propose to the Meeting, is one that I am sure will require no arguments of mine to recommend it to your very cordial adoption. You have heard from the President, how the distinguished traveller, who is here to-day to give an account of the achievements which he has performed on the field of Africa, you have heard, how cordially and usefully he was assisted by the Governors of the Portuguese Establishments on the coast of Africa. There is, perhaps, no nation which can boast more than Portugal, of having largely contributed to early geographical enterprise, to our better knowledge of the globe which we inhabit, and to the spread of commerce throughout the earth. I may also say that the mention of the name of Portugal is always agreeable to British ears, because there is no country with which we are united by an older, by a closer, and, I trust, by a more enduring connection. I think it is fortunate and gratifying to us, on the present occasion, that we have the advantage of having among us, the distinguished nobleman who represents Portugal in this country; therefore, we shall be able to convey to the Portuguese authorities, through him, the acknowledgment which, I am sure, we must be all anxious to make on the present occasion. I am too well aware of the value of your time, and of the superior claims that others have upon it, to be desirous of addressing you at any length. Of the importance of the discoveries made in Africa, I am sure we must all feel the strongest and deepest sense; it is, at all events, a matter of liberal curiosity to all men, to obtain a better knowledge of our earth. But there are interests very dear to the people of this country, which are

closely connected with everything that relates to a better knowledge of Africa. There is none, I believe, which has taken a faster hold on the people of Britain than, not only to put a stop to the horrible traffic in slaves, which was once the disgrace of our land as much, if not more than of any other; but also, as far as possible, to repay to Africa the debt which we owe her, by promoting in every manner, with regard to her inhabitants, the interests of civilization and commerce. We must feel how important a better knowledge of the internal resources and of the condition of Africa must be, in all the efforts which Parliament or Statesmen can make in that direction. I will not trespass longer upon your time, but conclude by reading the Resolution which has been placed in my hands, and which is one that I am sure will meet from you, a very cordial reception :—

“That the grateful thanks of the Royal Geographical Society be conveyed, through his Excellency Count de Lavradio, the Minister of the King of Portugal, to His Majesty’s Authorities in Africa, for the hospitality and friendly assistance they afforded to Dr. Livingston, in his unparalleled travels from St. Paul de Loanda to Tete and Quilimane, across that continent.”

SIR HENRY RAWLINSON, F.R.G.S., then said—Sir, I could have wished that the task of seconding the Resolution had been confided to abler hands; but since the President has issued his orders—orders which are equivalent to the laws of the Medes and the Persians, with which I am tolerably well acquainted,—I am obliged humbly to bow to the task. After the eloquent description you have heard of the merits of the Portuguese nation, it would ill become me to intrude long upon your time; but I would wish to call your attention to the really great obligations which science is generally under to the Portuguese, especially with regard to the geography of Africa. We are too apt to forget the debt of gratitude which we owe to them for our knowledge of the interior of Africa, almost up to the present time, when Dr. Livingston has completed the chain of their discoveries. We must remember that it was Vasco de Gama, a Portuguese, in the first instance, who doubled the Cape of Good Hope. The Portuguese have established settlements throughout Southern Africa from the earliest times down to the present, and until Dr. Livingston has laid down all his discoveries upon the map, the old Portuguese maps of the interior of Africa, especially the southern portion, are the best available. It is singularly interesting and gratifying to find, that it should be to the Portuguese Governors, that we are indebted for the hospitable reception, which they gave to our distinguished traveller, Dr. Livingston, and which has enabled him to return home in safety, and acquaint us with the results of all his discoveries. As you are about to hear from Dr. Livingston some brief account of his travels, I will not longer trespass on your time, but merely second the Resolution which has been submitted to your notice.

The Resolution having been put from the Chair, was carried unanimously.

The Count de LAVRADIO then rose, and after a brief apology in English for his want of fluency in our language, thus spoke in French :—

M. le Président,—Je ne m’attendais pas à avoir l’honneur de parler devant vous; ce fût donc avec hésitation que je me suis levé, et c’est avec timidité que je vais avoir l’honneur de vous adresser quelques paroles, pour vous ex-

primer ma gratitude de la résolution que vous venez de prendre et de proclamer.

Mon premier devoir est d'adresser mes, aussi sincères que vifs, remerciemens au nom du Souverain que j'ai l'honneur de représenter, et de la nation Portugaise à laquelle j'appartiens, au Right Hon. Mr. Labouchere, non seulement pour la résolution qu'il a proposé à la Société Royale de Géographie d'adopter, mais aussi pour les sentiments d'admiration et d'estime qu'il a si bien exprimé pour la mémoire des intrépides et savants navigateurs Portugais qui, en découvrant des mers et des terres jusqu'alors inconnues, portèrent partout les germes de la civilisation, et rendirent des très grands services aux sciences. A Sir H. Rawlinson, je prie aussi de vouloir bien recevoir mes remerciemens, pour l'aimabilité avec laquelle il a appuyé la proposition de Mr. Labouchere, en rappelant au souvenir de la Société, les importantes découvertes faites par les Portugais ; à vous, M. le Président, pour la bienveillance avec laquelle vous avez soumis à l'approbation de la Société, la proposition de Mr. Labouchere ; et à vous, Messieurs les Membres de la Société Royale de Géographie, pour l'unanimité de votre approbation.

Je vous assure, que je m'empresserai d'avoir l'honneur de transmettre à mon gouvernement, la résolution qui vient d'être prise, et j'en suis sûr il en sera très flatté. Lorsque j'ai appris que le Dr. Livingston allait entreprendre de traverser l'Afrique Méridionale, en allant de la côte occidentale à l'orientale, j'ai écrit à mon gouvernement, en le priant d'expédier les ordres les plus positifs, pour que tous les colonies Portugaises s'en prêtent au Dr. Livingston, toute la protection dont il pourrait avoir besoin, pour poursuivre ses voyages d'une manière sûre et convenable. Je suis donc heureux d'apprendre que les ordres de mon gouvernement furent exécutés.

Maintenant, M. le Président et MM. les Membres de la Société Royale de Géographie, permettez-moi, que je vous remercie en mon propre nom, de l'honneur que vous avez bien voulu me faire en m'invitant à cette séance. En toute occasion, j'aurais été heureux et fort honoré de me trouver parmi l'élite des savans géographes et voyageurs Anglais ; mais aujourd'hui, mon bonheur est encore plus grand, puisque cette séance solennelle est particulièrement destiné à célébrer le retour en Europe du Dr. Livingston, de ce savant courageux, de cet ami de l'humanité, qui, bravant les plus grands dangers, s'exposant à toute sorte de privations, employa les plus belles années de sa vie, à parcourir l'Afrique Centrale dans les seuls buts d'enrichir les sciences, et de propager dans les régions lointaines, la morale évangélique, et avec elle les bienfaits de la véritable civilisation.

Des hommes, tels que le Dr. Livingston, sont, permettez-moi l'expression, des véritables Providences, que le Ciel, dans sa clémence, nous accorde pour nous consoler de tant d'individus inutiles ou méchants qui peuplent une partie de la terre.

Tout le monde sait qu'il y a à peu près quatre siècles et demie, que quelques navigateurs Portugais, aussi courageux qu'instruits, entreprirent et achevèrent des grandes découvertes. Les noms de Zamo, de Prestrillo, des Dias, du grand Vasco de Gama, et de tant d'autres, sont bien connus ; mais tout le monde ne sait pas que, en même temps que ces navigateurs parcouraient les mers, reconnaissaient les côtes, et tâchaient de faire le tour de l'Afrique, pour se rendre en Asie, d'autres tâchaient d'arriver au même but, en traversant l'intérieur de l'Afrique. Avant l'année 1450, par les ordres et avec les instructions du grand et immortel Infante Don Henri de Portugal, le prince le plus savant et le plus grand de son temps, Jean Fernandez pénétra dans l'intérieur de l'Afrique, où, peu de temps après, alla le rejoindre Anton Gonsalves.

Quelques années après, plusieurs autres Portugais pénétrèrent dans l'intérieur de l'Afrique ; quelques uns furent à la recherche de Timbuctu, et d'autres dans diverses autres directions. L'histoire nous a conservé les noms de plu-

sieurs de ces voyageurs, et on peut dire que les Portugais n'ont jamais interrompu leurs tentatives de pénétrer dans l'intérieur de l'Afrique. Vers le fin du siècle dernier, le savant Dr. Lacerda, muni de bons instruments, se proposa de traverser l'Afrique Méridionale, allant de la côte orientale vers l'occidentale. Malheureusement, la mort l'a surpris au milieu de ses savants voyages, dans les états du Roi de Cazembe.

Plus tard d'autres voyageurs entreprirent de traverser l'Afrique, et de 1806 à 1811, Pedro Jean Baptista et Amaro José, avec les instructions du Colonel Francisco Honorato de Castro, allèrent de la côte occidentale à l'orientale, et revinrent à Loando par le même chemin, après une absence de plus de quatre ans. Le journal de leurs voyages a été imprimé. Malheureusement, ils n'étaient pas assez instruits, pour pouvoir déterminer astronomiquement la position des différents lieux, qu'ils ont parcouru.

Messieurs, je m'arrête, et si je cite ces faits et ces noms, ce n'est nullement pour diminuer la gloire qui appartient au Dr. Livingston ; bien au contraire, c'est pour reconnaître qu'il a obtenu des résultats, plus complets que ceux qui le précéderent. Le nom du Dr. Livingston est déjà inscrit dans l'histoire de la civilisation de l'Afrique Méridionale, et il y occupera toujours, une place très distinguée.

Honneur donc au savant Dr. Livingston !

M. le Président, et Messieurs, je vous demande pardon d'avoir si long-temps abusé de votre complaisance, et je vous remercie de la bienveillance avec laquelle vous avez daigné m'écouter ; mais avant de m'asseoir, permettez encore que je vous prie d'agréer les vœux que je fais pour la prospérité de la Société Royale de Géographie, qui a rendu tant et de si grands services aux sciences, au commerce, et à la civilisation. Agréez aussi les vœux que je fais pour que l'Empire Britannique, cette terre d'ordre et de liberté, ce pays où tous les malheurs trouvent un asile sûr et généreux, conserve pour toujours sa puissance. Je fais ces vœux, comme représentant du plus ancien, du plus constant, et du plus fidèle allié de l'Angleterre ; je les fais aussi comme simple individu.

The SECRETARY then read extracts from the three last communications, addressed by Dr. Livingston from Africa to Sir Roderick Murchison, which had been reserved for that occasion. They were full of minute and graphic details relating to the regions explored by the traveller, and were listened to with the utmost interest. At their conclusion,

The PRESIDENT said : We return thanks to Dr. Livingston for having communicated these able documents to us, a very small portion of which has been read by Dr. Shaw. It is impossible, on an occasion like the present, fully to estimate the value of Dr. Livingston's communications ; but there are so many subjects, some of them of deep interest to persons here assembled, and others of vast importance to the world at large, that I hope Dr. Livingston will explain to us, *vivâ voce*, some of those remarkable features in his travels, on which he would wish most to dwell. I particularly invite him to indicate to the Meeting, those portions of the country, the produce of which is likely to be rendered accessible to British commerce. I wish him to point out, on the diagram made for this occasion by Mr. Arrowsmith, the lines of those ridges which he describes as perfect *sanatoria* or healthy districts, distinguished from the great humid or marshy region in the interior, and as being equally distinguished from the deltas on the coast, in which the settlements of Europeans have hitherto been made. It is important to observe that large tracts of this country are occupied by *Coal-fields*, of which we have had the first knowledge

from our distinguished traveller. There are indications throughout the flanking ranges, of great disturbance of the strata, by the intrusion of igneous rocks which have very much metamorphosed them. The strata upon the two sides of Africa, dip inwards, and the great interior region thus forms an elevated plateau arranged in basin-shape. This vast basin is occupied by calcareous tufa, the organic remains in which seem to indicate that at a period not remote in the history of the globe, this great marshy region has been desiccated, leaving in these broad plateaus of calcareous tufa, the remains of lacustrine and land animals, which are still living in the country. I hold in my hand a geological map of the Cape territory as prepared by Mr. Bain, which, coupled with the discovery of Lake Ngami, led me to offer to you that speculation on the probable physical condition of the interior of Africa which the observations of Dr. Livingston have confirmed.*

DR. LIVINGSTON then rose, and, pointing to the diagram of Africa, said : The country south of 20° is comparatively arid ; there are few rivers in it, and what water the natives get, is chiefly from wells. But north of 20°, we find a totally different country, wonderfully well watered, and very unlike what people imagine Central Africa to be. It is covered by a network of waters, which are faintly put down in the map, and chiefly from native information. The reason why we have trusted to native information in this case, is this : when Mr. Oswell and I went up to the Chobé in 1851, we employed the natives to draw a part of the Zambesi in the centre of the country, which had hitherto been unknown to Europeans. They drew it so well, that although I have since sailed up and down the river several times, and have taken observations all along, I have very little to add to that native map. The natives show on their maps that you can go up one river and get into another. You can go up the Kama, for instance, and get into another, the river of the Banyenko. You can go up the Simāh and get into the Chobé, and can come down into the Zambesi, or Leambye. You can go up the river Teôge, and round again by the Tzō to Lake Ngami. If you go up the Loi, you can get into the Kafue. And they declare that if you go up the Kafue in a canoe, you can get as far as the point where that river divides from the Loangua. All these rivers are deep and large, and never dry up as the South African rivers do. Some will say that the natives always tell you that one river comes out of another. Yes, if you do not understand the language you may say so. I remember when Colonel Steele and I were together, the natives pointed him out as still *wild*, and said I was *tame*, because I understood the language. Now, I suppose, when a geographer tells you that, when the natives say, “one river runs into or out of another,” they don’t mean what they say ; but, in reality, the natives mean that the geographer is still *wild*, he is not *tame*, *i. e.* he does not know the language. I found the natives to be very intelligent ; and, in this well watered part, to be of the true Negro family. They all had woolly hair, and a good deal of it, and they are darker than those who live to the south. The most remarkable point I noticed among them, was the high estimation in which they hold the women. Many of the women become chiefs. If you ask a man to do something for you, he will perhaps make some arrangement about payment ; but before deciding to do it, he is sure to say, “Well, I will go home and ask my wife.” If the wife agrees to it, he will do what you want ; but if she says no, there is no possibility of getting him to move. The women sit in the public council, and have a voice in the deliberations. Among the Bechuanas the men swear by their fathers, but among the true negroes they swear by their *mothers*. Any exclamation they make is, “Oh, my mother !”—while among the Bechuanas and the Caffres they swear by their father. If a woman separate from her husband, the children all go with the mother—they all stick by

* See President’s Address, vol. xxii, p. cxxii, 1852.

the mother. If a young man falls in love with a young woman of another village, he must leave his own village and live with her; and he is obliged to keep his mother-in-law, in firewood. If he goes into her presence, he must go in a decent way, clapping his hands in a supplicatory manner; and if he sits, he must not put out his feet towards her—he must bend his knees back, and sit in a half-bent position. I was so astonished at this, that I could scarcely believe their own statements as to the high estimation in which they held the ladies, until I asked the Portuguese, if they understood the same, as I did. They said, exactly the same; they had been accustomed to the natives for many years, and they say that the women are really held in very great estimation. I believe they deserve it; for the whole way through the centre of the country, we were most kindly treated by them. When I went up the Zambesi, I proceeded as far as the 14th degree, and then returned to Linyanti. I found the country abounding in all the larger game. I know all the country through which Mr. Gordon Cumming and others have hunted, and I never saw anything before like the numbers of game that are to be found along the Zambesi. There are elephants all the way to Tete, in prodigious numbers, and all the other large game, buffaloes, zebras, giraffes, and a great variety of antelopes. There are three new species of antelope that have never been brought to Europe.

Seeing the country was well supplied with game, I thought it was of little use burdening my men with other provisions; I thought I could easily supply our wants with the gun, and I did not wish to tire them and make them desire to return before we had accomplished our journey; so we went with scarcely anything. All the way up the river we had abundance of food, and any one who is anything of a shot, may go out and kill as much in two or three hours, as will serve for three or four days. The animals do not know the gun, and they stand still, at bowshot distance. We got on very well in this way, until we came to Shinté. There we found that the people, having guns, had destroyed all the game in the district, and that there was nothing left, but mice; you see the little boys and girls digging out the mice. I did not try to eat them, but we were there obliged to live entirely upon what the people gave us. We found the women remarkably kind to all of us; the same in going down the Zambesi. Whatever they gave, they always did it most gracefully, very often with an apology for its being so little. Then, when coming to the eastward, we found it just the same. They supplied us liberally with food wherever we went, all the way down, till we came near to the settlements of the Portuguese. In the centre of the country, we found the people generally remarkably civil and kind; but as we came near to the confines of civilization, then they did not improve. We had a good deal of difficulty with different tribes, as they tried to make us pay for leave to pass. It so happened that we had nothing to pay with. They wanted either an ox, a gun, or a man. I told them that my men had just as good a right to give me, as I had to give one of them, because we were in the same position—we were all *free men*. Then they wanted an ox, and we objected to it, saying, "These oxen are our legs, and we cannot travel without them; why should we pay for leave to tread upon the ground of God, our common Father?" They agreed it was not right to ask payment for that, but said it had always been the custom of the slave-traders, when they came in, to give a slave or an ox, and we ought to do the same. But I said, "We are not slave-dealers, we never buy nor sell slaves." "But you may as well give us an ox," they replied, "it will show your friendship; we will give you some of our food, if you give us some of yours." If we gave them an ox, they very often gave us back two or three pounds of our own food; this is the generous way they paid us back. But with the women we never found any difficulty.

Let me mention the punishment which women inflict upon their husbands in some parts. It is the custom of the country for each woman to have her own

garden and her own house. The husband has no garden and no house, and his wives feed him. I have heard a man say, "Why, they will not feed me; they will give me nothing at all." A man may have five wives, and sometimes the wives combine and make a strike against him. When he comes home he goes to Mrs. *One*. She says, "I have nothing for you; you must go to Mrs. *Two*." He then goes to Mrs. *Two*, and she says, "You can go to the one you love best," and in this way the husband is sent from one to the other, until he gets quite enraged. In the evening I have seen the poor fellow get up in a tree, and in a voice loud enough to be heard by the whole village, cry out, "I thought I had married five wives, but I find I have married five witches; they will not let me have any food." The punishment a woman receives for striking her husband, I thought very odd, the first time I saw it in the town of Sechele. The chief's place is usually in the centre of the town. If a woman happens to forget herself so far as to give her husband a blow, she is brought into the centre of the town, and is obliged to take him on her back and carry him home, amid the jeering and laughter of the people, some of the women crying out, "Give it to him again." Slavery exists in the country, *i. e.* domestic slavery; but the exportation of slaves is effectually repressed. I found in Angola, that slaves could scarcely be sold at all. I saw boys of 14 years of age, sold for the low sum of 12s. If they could send these to Brazil, they would fetch a very much higher price, perhaps 60 dollars. In passing along, we went in company with some native Portuguese, who were going into the interior, and who had eight slave women with them, and were taking them towards the centre of the country to sell them for ivory. It shows that the trade is turning back towards the interior. In passing through the country, I found that the English name had penetrated a long way in. The English are known as the tribe "*that likes the black man*." The Portuguese, unfortunately, had been fighting with them near Tete; but the natives had been aided by half-breeds, and kept the Portuguese shut up at Tete, two whole years. In coming down the river, I knew nothing of this war. Once we saw great numbers of armed men going along the hills and collecting into a large force, and all the women and children sent out of the way. When we got to where they were, some of the great men came to ask what I was? "Are you a Mozungo?"—that is the name they apply to the Portuguese; I did not know it, however, at that time. "No," I said, "I am a Lekoa." "Then," they said, "they did not know the Lekoa." I showed them my arm. I could not show my face as anything particularly white, but I showed my arm, and said, "Have the Mozungo skin like that?" "No, no; we never saw such white skin." "Have they long hair like mine?"—the Portuguese make a practice of cutting the hair short. "No; you must then be one of the white tribe '*that loves the black man*.'" "Yes, I am." I was then in the midst of the belligerents, without having any wish to engage in the quarrel. They finally allowed me to pass. Once when we came to a tribe, one of my head men seemed to have become insane and ran away, and we lost three days seeking for him. This tribe demanded payment for leave to pass, and I gave them a piece of cloth. In order to intimidate us they got up the war dance, and we made them another offer, and gave another piece of cloth. But this was not satisfactory, and then they got up their war dance in full armour, with their guns and drums and everything quite warlike, in the sight of our encampment. My men had been perfectly accustomed to fighting; they were quite veterans, but in appearance they were not near so fine as these well-fed Zambesians. My men said to me, "Will you allow us to keep their wives?" They thought they were intimidating us, but my men were perfectly sure of beating them. One of my chief men seemed to be afraid, because they never make a war dance without intending to attack, and got up during the night and said, "There they are, there they are!" and ran off, and we never saw him again.

The country is full of lions, and the natives believe that the souls of their

chiefs go into the lion, and consequently when they meet a lion they salute and honour it. In travelling, the natives never sleep on the ground; they always make little huts up in the trees. We had a good many difficulties of the nature I have described, with the different tribes on the confines of civilisation. The people in the centre of the country seem totally different from the fringe of population near the coast. Those in the centre are very anxious to have trade. You may understand their anxiety in this respect when I inform you, that the chief of the Makololo furnished me with 27 men and 15 oxen, canoes, and provisions, in order to endeavour to form a path to the West Coast; and on another occasion the same man furnished 110 men, to try and make another path to the East Coast. We had found the country so full of forest, and abounding with so many rivers and so much marsh, that it was impossible to make a path to the west, and so we came back and endeavoured to find one to the east. In going that way, we never carried water a single day. Any one who has travelled in South Africa, knows the difficulty of procuring water, but we were never without water a single day. We slept near water, passed by water several times during the day, and slept near it again. The western route being impracticable for waggons, we came back, and my companions returned to their friends and relatives. I did not require to communicate anything about our journey, or speak even a word about what we had seen; as my men got up in all the meetings which were held, and told the people of what had passed. One of the great stories they told was, "We have been to the end of the world. Our forefathers used to tell us that the world has no end, but we have been to the end of the world. We went marching along, thinking that what the ancients had told us was true, that the world had no end; but all at once the world said to us, 'I am finished; there is no more of me; there is only sea in front.'" All my goods were gone when I got down into the Barotse valley, among the Makololo, and then they supplied me for three months; and in forming the eastern path, which I hope will be the permanent one into the interior of the country, the chief furnished me with twelve oxen for slaughter and abundance of other provisions, without promise or expectation of payment. At one time it was thought, instead of going down the way we came, we should go on the other or south side of the river. But this river forms a line of defence against the Matabele, where my father-in-law, Mr. Moffat, went. I was persuaded by some to go in that direction. But when I had heard the opinions of all who knew the country, and those who had lived in that direction, I resolved to go north-east, and strike the Zambesi there.

In passing up towards Loanda, we saw that the face of the country was different, that it was covered with Cape heaths, rhododendrons, and Alpine roses, showing that we must be on elevated ground. Then we came to a sudden descent of 1000 feet, in which the river Coango seemed to have formed a large valley. I hoped to receive an aneroid barometer from Colonel Steele, but he had gone to the Crimea. In going back, therefore, I began to try the boiling point of water, and I found a gradual elevation from the west coast until we got up to the point, where we saw the Cape heaths and rhododendrons; then, passing down inland, we saw the rivers running towards the centre of the country, and the boiling point of water showed a descent of the surface in that direction too. This elevated ridge is formed of clay slate. In going north-east, towards the Zambesi, we found many rivulets, running back towards the centre of the country. Having gone thither, we found the elevation the same as it was on the western ridge, and the other rivers, as described by the natives, flowing from the sides into the centre, showing that the centre country is a valley—not a valley compared to the sea, but a valley with respect to the lateral ridges. There were no large mountains in that valley; but the mountains outside the valley, although they appeared

high, yet, actually, when tried by the boiling point of water, were not so high as the ridges, and not much higher than the valley.

THE PRESIDENT.—Will you describe the White Mountains?

DR. LIVINGSTON.—They lie to the north-east of the Great Falls. They are masses of white rock somewhat like quartz, and one of them is called "Tabacheu," which means "white mountain." From the description I got of its glistening whiteness, I imagined that it was *snow*; but when I observed the height of the hill, I saw that snow could not lie upon it.

THE PRESIDENT.—The Society will observe that this fact has an important application.

DR. LIVINGSTON.—I observed to them, "What is that stuff upon the top of the hill?" They said it was stone, which was also affirmed to me while I was at Linyanti, and I have obtained pieces of it. Most of the hills have this coping of white quartz-looking rock. Outside the ridges the rocks are composed of mica and mica-slate, and crystalline gneiss at the bottom. Below we have the coalfield, which commences at Zumbo. Higher up there are very large fossil trees, of which I have brought specimens.

THE PRESIDENT.—The point to which I called your attention with reference to the white rocks, is important, as it may apply to the mountains towards the eastern coast of Africa, which have been supposed to be covered with snow, and are commonly called the "Mountains of the Moon." It seems that the range of white-capped hills, which Dr. Livingston examined, trended towards those so called mountains, and it may prove that the missionaries, who believe that they saw snowy mountains under the equator, have been deceived by the glittering aspect of the rocks under a tropical sun. I would also ask Dr. Livingston if he has formed any idea of that great interior lake, which is said to be 600 or 700 miles long; and whether the natives gave him any information respecting it?

DR. LIVINGSTON.—When I was on my way from Linyanti to Loando, I met with an Arab, who was going to return home towards Zanzibar across the southern end of the lake "Tanganyenko," and who informed me that in the country of the Banyassa (Wun' Yassa?) there is an elevated ridge which trends towards the N.N.E. The lake lies west of it, and in the northern part is called Kalagwe. They cross the southern end of it, and when crossing they punt the canoe the whole way, and go from one island to another, spending three days in crossing. It seems, from the description I got from him, to be a collection of shallow water, exactly like Lake Ngami, which is not deep either, as I have seen men punting their canoes over it. It seems to be the remnant of a large lake, which existed in this part, before the fissure was made to allow the Zambesi to flow out. That part of the country is described by many natives as being exceedingly marshy. The Makoloko went up to the Shuia Lake and found all the country exceedingly marshy, and a large lake seems to be actually in existence, or a large marsh with islands in it. But it can scarcely be so extensive as has been represented, as in that case I must have crossed part of it or heard more of it.

MR. F. GALTON, F.R.G.S.—I should be glad to ask Dr. Livingston, whether, in his route across Africa, he fell in with any members of the Hottentot race. In old maps the northern limit of the Hottentot race is placed but a short distance beyond the Orange River; later information has greatly advanced their boundary, and, in my own travels, I found what appeared to be an important headquarters of that people, at latitude 18° S. There they were firmly established in the land, and were on intimate terms with their negro neighbours, the Ovampo. These Hottentots asserted that their race was equally numerous still farther to the northward of the most distant point I was able to reach, and I have been unable as yet, to obtain any information by which any northern limit to the extension of the Hottentot race can, with certainty, be laid down.

DR. LIVINGSTON.—When I went up to discover Lake Ngami with Mr. Oswell, I found people who have the “click” in their language, and who seem to be Hottentots; they had formerly large quantities of cattle, and intermarry with the Bushmen. Again, two Portuguese of Loanda described to me a people in 12° S. as Bushmen, but I did not see them.

MR. GALTON.—I might mention in corroboration of Dr. Livingston's report of a gradual desiccation of the Bechuana country, that the Damaras entertain a precisely similar belief. They say that within the existing generation, their country has become dried up to a marked extent; hence, without doubt, this same physical phenomenon affects the entire breadth of Southern Africa.

DR. LIVINGSTON.—You not only see remains of ancient rivers all through the country, but you find actually the remains of fountains; you see holes made in the solid rock, where the water has fallen, when flowing out of these fountains, and you find in the sides of some of the holes, pieces of calcareous tufa, that have been deposited from the flowing of the water.

PROFESSOR OWEN: I have listened with very intense interest to the sketches of those magnificent scenes of animal life, that my old and most esteemed friend, Dr. Livingston, has given us. It recalls to my mind the conversation I had the pleasure to enjoy with him in the Museum of the College of Surgeons, seventeen years ago. I must say, that the instalment which he has given us of his observations on animal life this evening, more than fulfils the highest expectations that I indulged of the fruit that science would receive from his intended expedition. It has, so far, exceeded all our expectations; but it is not only in reference to those magnificent pictures of mammalian life,—that reference is to those new forms of that peculiar family of ruminants, the antelopes; but it is to those indications of the evidence of extinct forms of animal life which interest me still more. I hope some fragments will yet come to us of those accumulated petrified remains of animals, which it has been Dr. Livingston's good fortune, among many very wonderful and unique opportunities of observing nature, to have seen.

MR. J. MACQUEEN, F.R.G.S., observed—Lacerda does not give either the longitude or the latitude of Tété. He gives the latitude of Maxenga to the north of Tété, $15^{\circ} 19'$ s., the estimated distance to which from Tété, according to the rate of time in travelling, places Tété, by my calculation, in $16^{\circ} 20'$ s. lat. Dr. Lacerda gives the latitude of the Isle of Mozambique, at the western entrance of the Lupala, $16^{\circ} 31'$ s. Dr. Livingston gives it $16^{\circ} 34'$, a concordance which proves the accuracy of both. Dr. Lacerda's accuracy, thus established, is of great importance, because he gives us two important astronomical observations far to the northward. The first, at Mazavamba, $12^{\circ} 33'$ s. lat., and $32^{\circ} 18'$ e. long., and 20 miles south of the Arroanga of the north, 260 miles from Tété, which is the same river as that designated the Loangua by Dr. Livingston, at its junction with the Zambesi. The second observation was made at Muíro Achinto, now called Chama, lat. $10^{\circ} 20'$ s., and long. $30^{\circ} 2'$ e., from which point Gamitto's daily bearings and distances enable us to fix the capital of Cazembe with sufficient accuracy. Westward of Mazavamba, about 60 miles, is the great mountainous chain of Maxinga, or Muchinga, rising from 16,000 to 17,000 feet above the level of the sea. A branch of it runs N.E., another to the westward, and a third to the S.S.W., by the Zumbo, stretching southward to the mountains of Chidam and those called Mushome.

The accounts of the Embarah are fully substantiated by Brocheda and the journeys of Ladislaus. Embarah is the Aimbara, or the chief tribe and ruler of the great province of Quanhama, situated to the westward of the great river Cubango. This river rises in Nammo, near the sources of the Cunene, but instead of joining that river, as hitherto supposed, it pursues its way on the westward of Bilé to the S.E., and joins the Leambye, and is doubtless the parent stream of the Chobé. This may give a great water communication from

the western portion of Bihé to the Indian Ocean, which is important. The land to the east of Bihé is very high. It is, properly speaking, the Libalé. In July and August, the hills are reported to be covered with snow, and the lakes and rivers to be completely frozen over. This degree of cold so near the equator (14° to 15° s. lat.) gives a very high elevation. Ladislaus in his southern journey penetrated to $20^{\circ} 5'$ s. lat., and $22^{\circ} 43'$ E. long., at which point he must have been at one time only about three days' journey distant from the point where Dr. Livingston was at that time, and who was probably the white man of a party described as riding on an ox. Ladislaus has also penetrated northwards and north eastwards around the Cassaby to $4^{\circ} 41'$ s. lat., and $25^{\circ} 43'$ E. long.

It affords me great pleasure to see Dr. Livingston among us. I have closely followed his journeys since I heard of him on the top of the volcanic Bakkaluka hills riding on the ox, convinced that he would soon send us most important information. Dr. Livingston has travelled more in Africa than any other traveller ancient or modern, while he has laid down with geographic accuracy every point over which he travelled from sea to sea—the Atlantic to the Indian Ocean.

CAPTAIN VARDON, F.R.G.S.—I beg to supply an omission which my friend, Dr. Livingston, has made this evening. He has expatiated at great length on the amiability of the African ladies; but there is one lady whom I met in South Africa, and from whom, I believe, many South African travellers, whom I see in this room, experienced the greatest kindness and hospitality. Dr. Livingston has not made any allusion to her, and I rise to do so. This lady, I need scarcely say, is his own wife. I observe here Colonel Steele, Mr. Oswell, Mr. Gordon Cumming, and others, who will bear me out in saying that we received the greatest kindness from Dr. and Mrs. Livingston; their hospitality was unbounded, and I am glad of having this opportunity of publicly thanking them before the Royal Geographical Society. Dr. Livingston has said, with his usual modesty, that he has not done much, that any of us might have done as much. I beg to differ from him. As to my own small excursion on the Limpopo, after what I have heard to-day, I feel so ashamed of myself, that I fancy I have only just returned from Blackheath.

COLONEL STEELE, F.R.G.S.—My travels in South Africa were much like Captain Vardon's. Dr. Livingston was my earliest companion in Africa, but we travelled such a short distance in company, that I am afraid any remarks I could offer, beyond again returning my best thanks to Dr. and Mrs. Livingston for their hospitality, would be of no importance to the Society.

THE PRESIDENT.—Colonel Steele's modesty has prevented him from stating that without the instruments with which he had provided Dr. Livingston, he could not have made the excellent observations which have been obtained.

MR. GORDON CUMMING begged to confirm what Captain Vardon had said with respect to the kindness with which Dr. Livingston received all parties who visited him. He was not aware that Dr. Livingston had alluded to the insect (the tsetse) whose bite is fatal to cattle. One year, while hunting in the mountains, he, Mr. Cumming, lost all his horses and oxen from the bites of this fly, and if it had not been for the kindness of Dr. Livingston in at once sending him his own cattle, he would scarcely have been able to have extricated himself from his dilemma and returned to Europe.

MR. J. CRAWFORD, F.R.G.S.—Perhaps Dr. Livingston will have the goodness to give us some notion of the state of society among these people, especially among the tribes that inhabit the plateau valley. That ought to be a place in which there is a considerable civilization with a decent form of government. They seem to have many advantages, an excellent climate, excellent soil, and an excellent supply of water. What is the state of the arts among those people? Do they understand the art of making malleable iron or steel? Do

they know the use of any other metal, or the use of alloys, as those of copper? Can they weave, or make bread? What plants do they cultivate? And what are they likely to produce in exchange for our merchandise? I strongly suspect, from what Dr. Livingston has said respecting the women, that the great portion of the labour, even of the field, is left to them, and is not performed by the men, otherwise how could the women be able to feed the men? They must work in order to procure that with which the men are fed. I expect the men are idle and the women laborious. Some men would appear to have as many as five wives. How come they to monopolise so many?

Dr. LIVINGSTON said : The new articles of commerce that I observed are chiefly fibrous substances, some of them excessively strong, and like flax. They abound in great quantities on the north bank of the Zambesi. There are also great quantities of a tree, the bark of the root of which is used by the Portuguese and natives as the Cinchona. It has been employed in fever by the aborigines of the country from time immemorial, and both the Portuguese and my companions and myself found it very efficacious. It is remarkable that where the fever most prevails, there the tree, which I believe to be a cinchona, abounds. It seems the remedy is provided for the disease, where it prevails most. Now, in connection with the opening up of this river and the fever, I have seen on the banks of the Zambesi whole forests of this Cinchonaceous tree, particularly near Senna. A decoction of the bark of the root has been found to act exactly as quinine : it is excessively bitter, and may prove a good substitute. There is also Calumba root, which the Americans purchase, to be used as a dye, and it is found in large quantities. A species of Sarsaparilla is to be found throughout the whole country. The sugar-cane grows abundantly, but the natives have no idea of sugar, although they have cultivated the cane from time immemorial. The chief of the Makololo sent about thirty elephant tusks down to the coast, and gave me a long list of articles, which I was to buy for him in the white man's country. As I had been entirely supported by him for several months, I thought it my duty to accept his commission, and I intend to obtain these articles for him. Among other things he ordered a sugar-mill. When he found that we could produce sugar from the cane, he said, "If you bring the thing that makes sugar, then I will plant plenty of cane, and be glad." Then, again, indigo grows all over the country in abundance. The town of Tete has acres of it; in fact, it is quite a weed, and seems to be like that which grows in India, for before the slave trade became so brisk indigo was exported from Tete. The country also produces the leaves of senna, and, as far as I could ascertain, exactly like that which we import from Egypt. There is plenty of beeswax through the whole country; and we were everywhere invited by the honey-bird to come to the hives. Any one who has travelled in Africa knows the call of the honey-bird. It invites travellers to come and enjoy the honey, and if you follow it, you are sure to be led to the honey. Some natives have given it a bad character. Sometimes, when a man follows the bird, he comes in contact with a lion or a serpent, and he says, "It is a false bird, it has brought me to the lion." But if he had gone beyond the lion, he would have come to the honey. The natives eat the honey and throw the wax away. In Angola it is different. There, a large trade in wax is carried on, and the bees are not so numerous as in the eastern parts of the country; but here they have no market. It was the same with ivory when Lake Ngami was discovered. They will not throw away an ounce of it now. Then, again, there are different metals found. There is a very fine kind of iron ore; and at Cazembe there is much malachite, from which the natives extract copper. Then there is gold round about the coal-field, and gold has been procured by washing from time immemorial. In former times the Portuguese went to different places for gold with large

numbers of slaves. It was before the time of the great exportation of slaves began. The chiefs had no objection to their washing for gold, provided they gave a small present first. Then there is coal near Tété; no fewer than eleven seams exist, one of which I found to be 58 inches in diameter. The coal has been lifted up by volcanic action. There is also a hot spring there. The thermometer stands at 160°. The coal from two of these seams could be easily exported, as they are situated on a small river, about two miles below Tété, and the coal could with very little trouble be brought down. When you go up the Luabo, or largest branch, the river is rather narrow, but as you ascend it gets much broader. The Mutu is another river that joins the Zambesi. At the point of junction of the Mutu or Quilimane river with the Zambesi, the beginning of the Delta, that river is three-quarters of a mile broad. When I passed down to that point it was a deep, large river, as it was then full. The Portuguese tell me there is always a large body of water in the river, during certain months in the year. This great body of water, spread over a large space, is in the dry season shallow, except in the channel, which is rather winding. At some seasons the channel changes its course. There are many reedy islands in it, and these are sometimes washed away. During five months of the year there is plenty of water for navigation, and during the whole year there is water enough for canoes. A vessel of light draught like the Portuguese launches, could go up to about 20 miles beyond Tété with the greatest ease, during those months. At Kebrabassa in Chicova, there are rapids, caused by certain rocks jutting out of the stream. I did not see them, as we were obliged in our descent to leave the river, on account of the rivulets being filled by the large river coming into flood, and to pass down by land all the way from the hill Pinkue to Vunga, and thence to Tété. There is another rapid called Kansala. Beyond that the river is smooth again, until you come to the "Great Falls of Victoria," where it would be quite impossible for any one to go up, as it is a deep fissure or cleft.

MR. CONSUL BRAND, F.R.G.S.—I am unwilling to be altogether silent on the present interesting occasion, having resided a good many years in that part of the West Coast of Africa which Dr. Livingston visited, and where our Associate Mr. E. Gabriel still resides. I had been obliged by ill health to leave the country shortly before Dr. Livingston's arrival; but the Doctor could not have fallen into better hands than into those of Mr. Gabriel. It was from a letter addressed by Mr. Gabriel to Lord Ellesmere, that this Society first heard of Dr. Livingston's arrival at Cassange. Mr. Gabriel immediately sent an invitation to the Doctor to take up his abode with him, during his stay at Loanda, and at his house the Doctor and his faithful companions found a home. The Doctor's first Report from Loanda to the London Missionary Society, was written at his sick-bed by Mr. Gabriel's own hand. He accompanied the Doctor part of the way on his return journey through Angola, and from that time up to the present, I have been in the habit of receiving from him letters manifesting the deepest interest in the Doctor's progress in the interior of Africa. I wish to mention these facts in justice to Mr. Gabriel, because on my arrival the other day in England, I received a letter from him simultaneously with Dr. Livingston's arrival, in which he expresses the utmost anxiety for the Doctor's safety. I have written, and a letter is now on its way to Loanda, announcing the Doctor's safe arrival among us. But it is not only to Mr. Gabriel that I would allude; for when Dr. Livingston arrived at Loanda, I was delighted to hear how he had been received by the Portuguese. I resided nearly nine years among this people, and I can testify that I never received greater acts of kindness from any other nation, than from them. I had among them some of my best friends, whose friendship was unequivocally tested under trials and in sickness, and I was delighted to hear that the same kindness which I had experienced at their hands had been experienced by Dr. Livingston. I am glad to have this opportunity of testifying,

in the presence of the Portuguese Minister, my gratitude for the kindness I received from his countrymen during my residence in the Province of Angola.

But the consequences resulting from Dr. Livingston's journey, are calculated to contribute so much to the interests of the Portuguese African Colonies, that I am sure in time, they will be more than repaid for the kindness they showed him. Dr. Livingston's arrival at Angola I look upon, as one of those opportune events, which sometimes have an important influence on the destinies of a country; at no period could such a visit have been more fortunate. The minds of men were unsettled in consequence of the depressed condition of the peculiar traffic which had so long been paramount, and the attention of thinking persons was turned to legitimate trade and the development of the resources of the country. Farther, the Portuguese Government had passed a measure for registering and gradually emancipating the slaves in their colonies. Those who take an interest in the progress of the African race will be glad to hear of this fact.

Dr. Livingston arrived about this time, and showed that by opening up a communication with the interior of Africa, a rich trade might be carried on, that would more than compensate for the loss the colony was likely to sustain from the abolition of the slave trade. The Doctor prophesied that, very soon after his journey had become generally known, an attempt would be made on the part of the tribes in the interior, to communicate with the coast. This prophecy has been fulfilled; for I learn from a communication from Mr. Gabriel that a caravan of negroes, fitted out by Sekeletu and led by one of the Arabs, who crossed from the coast of Zanzibar to Benguela in 1851, had arrived at Loando by way of Bihé. This expedition has not, it would seem, been very profitable, owing to causes incident, I should hope, only to first attempts; but I trust that experience will render the next more successful. I shall not, at this late hour, read Mr. Gabriel's very interesting communication, but limit myself to stating the fact it announces, which proves that the inland tribes are anxious to open up a communication with the coast, and shows how correctly Dr. Livingston calculated the result.

I wish to mention another result of Dr. Livingston's visit. At Loanda we had but one small newspaper; the Doctor wrote a series of articles for it, which appears to have stimulated a literary tribe, and you here see the 'Loando Aurora, a Literary Journal,' printed at the Government press, and, I believe, one of the fruits of Dr. Livingston's visit to that city.

The PRESIDENT.—I have now only to congratulate the Meeting upon having received so much instruction from Dr. Livingston. I may well say he has communicated to us the outlines of a book, which I hope will soon be published for the information of the British public. I am glad to add that there is no person fuller of gratitude to the Portuguese than Dr. Livingston himself. If he has not here expatiated upon that subject, I can testify that in private letters which he has addressed to me, he has uniformly dwelt upon the very kind and liberal conduct of the Portuguese Authorities, officers, and people to himself and party. He was also most kindly received by General Hay, commanding Her Majesty's forces in the Mauritius, and restored to health by the hospitality of our countryman.

The Resolute.—The PRESIDENT finally announced to the Meeting that, at the request of the Council, he had invited Captain Hartstene and the American officers of the 'Resolute' to dine with the Society prior to their departure from this country. The day had not been appointed as yet, as Captain Hartstene had been suddenly called to his ship—Her Majesty the Queen having signified her intention to visit the 'Resolute' on the next day.

Fifth Meeting, Jan. 12, 1857.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS.—Colonel Smyth O'Connor, John Palliser and J. D. Crum Ewing, Esqrs., were officially introduced upon their election.

ELECTIONS.—Captain G. H. Richards, R.N.; Captain D. J. Herd; Lieutenant Fairholme, R.N.; Clarence Braddyll; James Crawford; E. Auchmuty Glover; Charles L. Gruneisen; Edw. Terrick Hamilton; Francis Nares; George Nelthropp; Henry Nesbitt; William Peters; W. G. Smith; John M. Teesdale; and Henry Tudor, Esqrs., were elected Fellows.

DONATIONS.—Among the more important donations presented to the Society since the last meeting, were 'The Atlas of the Government of Tver,' executed under the superintendence of General Major Mendt, and presented by the Imperial Geographical Society of St. Petersburg; Papers containing historical and other information relative to ports and places in and about the Persian Gulf, presented by the East India Company; the 'Red River of Louisiana,' by Lieut. Marcy, U.S. Navy; Sitgreave's 'Expedition to the Zuni and Colorado Rivers,' presented by General Mercer; 'Supplement to Dr. Blackie's Imperial Dictionary;' the Transactions of various Societies, &c.; Stanford's Maps of London, with New Postal Sub-Divisions, &c.

The Livingston Testimonial-Fund Papers were laid on the table.

ANNOUNCEMENTS.—The PRESIDENT said, with reference to the dinner offered to Captain Hartstene and the American officers who brought home the 'Resolute,' if it had been possible for those gentlemen to have accepted the invitation, he had every reason to believe, from the spirit shown by the Fellows of the Geographical Society and their numerous friends, that it would have been one of the most effective and numerously attended meetings, ever given in the Metropolis by any Scientific Body. He regretted that it did not comport with the arrangements of Captain Hartstene and his brother officers, who had expressed themselves quite overcome by English hospitalities, to accept the invitation which emanated from the Geographical Society.

Capt. Hartstene.—After the ballot had been taken, the PRESIDENT said, he held in his hand twenty-seven proposals for the admission of Candidates into the Society. It was a remarkable event; one which had scarcely occurred in any Scientific Society in the metropolis. The first on the list was an Honorary member; and he was sure the members would agree with him that the Council had done

right in proposing that Captain Hartstene, of the United States Navy, should be an Honorary member.

The papers read were—

1. *Proposed Exploration of the River Orinoco, &c.* By Rear-Admiral Sir CHARLES ELLIOT, late Governor of Trinidad.

Communicated by Sir RODERICK I. MURCHISON.

AN officer administering the government of a British colony, situated within a few hours' steaming of the mouth of the Orinoco, would naturally recur with interest to Humboldt's account of his explorations in that river, of its intersection with the majestic Amazon, by the confluence of the waters of the Cassiaquare and the Rio Negro, a great affluent of the Amazon, and of the still shorter means of connecting these two stupendous river systems, comprising, according to that great authority, a surface of 190,000 square leagues, by the easy opening of a canal of 7 or 8 miles long, at the Isthmus of Tuamini, situated between the headwaters of the river of that name, falling into the Orinoco, and the Rio Negro into the Amazon. In that voyage of 75 days and 1500 miles, in a pirogue of scarcely three feet breadth, which had its commencement at San Fernando on the Apure, and closed at Angostura on the lower Orinoco, Humboldt and Bonpland collected not merely a body of scientific observations, which in point of amount, variety, and value, have never been exceeded by any travellers, but Humboldt enriched the narration with reflections and indications of unsurpassable practical importance.

No investigations could be more worthy of the reputation of this great country, or more conducive to its vast commercial interests, than those to which Humboldt has called attention in that part of his narrative, in which he describes his voyage, setting out at San Fernando on the Apure, to its confluence with the Orinoco; up that stream, from that point, as high as San Fernando de Atabapo, across the short portage from the Tuamini to the Rio Negro, occupying four days-journeying in the forest; down that noble affluent of the Amazon to the Brazilian frontier at St. Carlos; thence retracing their course to San Fernando de Atabapo by the way of the Cassiaquare and Orinoco, thus establishing the connection of these two great river basins:—

“Depuis que j'ai quitté les bords de l'Orinoque et de l'Amazon,” says Humboldt, writing in 1812 or 1813, “une nouvelle ère se prépare pour l'état social des peuples de l'Occident. Au fureur de dissensions civiles succéderont les bienfaits de la paix, un développement plus libre des arts industriels. Cette bifurcation de l'Orinoque, cette isthme de Tuamini si facile à franchir

par un canal artificiel, fixeront les yeux de l'Europe commerciale. Le Cassi-aquare, large comme le Rhin, et dont le cours a 180 milles de long, ne formera plus en vain un ligne navigable entre deux bassins des rivières qui ont une surface de 190,000 lieues carrées. Les grains de la Nouvelle Grenade seront portés aux bords de Rio Négro; des sources de Napo, et de l'Ucaylé, des Andes de Quito, et du Haute Péru, on descendra en bateau aux bouches de l'Orinoco, sur une distance qui égale celle de Timbuctu à Marseilles; un pays neuf, à dix fois plus grand que l'Espagne, et enrichi des productions les plus variées, navigable dans tous les sens par l'intermède du canal naturel du Cassiaquare, et du bifurcation des rivières. Un phénomène, qui sera un jour si important pour les relations politiques des peuples, mérite, sans doute, d'être examiné avec soin."

In the Atlas accompanying the narrative, published by Humboldt at Paris in 1814, he gives a map of the course of the Apure, from its headwaters to its confluence with the Orinoco, and it is impossible to peruse his account of the countries, and the rich and varied products attainable through that line of navigation, without recognizing the force of his reiterated notice of the prospective value of that stream of trade and intercourse. But he presses still more urgently on the importance of the navigation of the Meta, which he compares with the Danube not in length, but in volume of water; and he also furnishes a map of this river in the Atlas. He describes it to have a navigation of at least 400 miles from its confluence with the Orinoco to its connection with the streams which descend from the table-lands of Santa Fé de Bogotá, and all the richest regions of New Grenada. From the Embarcadero on the river San Juan, falling into the Meta, the distance to Bogotá by the valleys of Apiay and Caqueza does not exceed 10 leagues. In point of shortness of land-travel, between navigation and the tableland and all other conveniences of trade, there seems reason to think that the route to Bogotá by the Meta would soon displace that by the Magdalena, the basin of which is comparatively of very inferior importance.

When the Orinoco and its affluents, especially the Meta, are well opened up by steam navigation, it is in the highest degree probable that Humboldt's view respecting the wheat supply of the continental shores and the islands of the Caribbean Sea will prove to be correct. They will easily draw that supply from Cundinamarca and the rich tablelands of New Grenada. Indeed, in years of comparative scarcity in Europe and the northern parts of America, these great streams may be freighted with heavy supplies of corn destined for these shores, and for those of the United States of America. In those surprisingly fertile soils and genial climates, men reap at the seasons when we sow, taking off two crops annually, of weight per acre almost, if not quite equal, to the best cornlands of Europe;

returns, it should be said, to cultivation, which would hardly deserve the name in this country.

Nothing can be more certain, than that judicious steam navigation on the Orinoco and its affluents, would soon show steadily increasing returns to capital. The regions drained by that system are incalculably rich in vegetable and mineral resources. The lower lands teem with tropical products and cattle; the valleys of the mountainous districts, and the table-lands, have the climate of temperate regions with the vigour of a tropical sun, and a soil of surpassing fertility. I asked Mr. Clay, many years since, in a voyage which we made together on the Mississippi, what he thought it would be reasonable to compute steam navigation had done in accelerating the settlement of that basin. He replied that he had often reflected on that subject, and he considered it scarcely an exaggeration to say that if it had pleased God to create those vast regions with all their present productive powers, but with no great watercourses rolling through them until many hundred years after they had been partially inhabited, the consequences could hardly have been more wonderful than those which had followed within his own short scope of observation, since the first establishment of steam navigation on the Mississippi and its affluents. But what is the basin of the Mississippi and its affluents, to the united basins of the Orinoco and the Amazon? Insignificant indeed, in every respect of area, and variety and value of natural resource.

It has often occurred to me, during my residence at Trinidad, that when the enthusiastic and heroic Raleigh sought, or feigned to seek, his El Dorado up the Orinoco, it could hardly have failed to strike that brilliant imagination, that he was upon the track of an El Dorado of far deeper significance, and more inexhaustible streams of wealth, in the truest sense of that word, than those mountains of gold, and cities and palaces paved with precious stones. The realisation of all the promise of that wondrous tale, would be poor indeed in comparison with the results of those grand and wise plans of Humboldt, founded, not upon impulses of cupidity, or visions of conquest, but on the sober deductions of exact knowledge, and the sure consequences to flow from the dissemination of the arts of peace, of commerce, and the endless train of civilization and improvement. "Rivers," says Pascal, "are roads that run, and lead us where we will;" and when we consider that this amazing network of waterpaths, longer by thousands of miles than the circumference of the globe, has its nearest exit to the shores of Europe, almost within sight of a British possession, it is certainly an abashing reflection that more has not been done to avail ourselves of these

advantages. Speaking as a professional man and with some experience of the spirit and purpose of a great maritime rival, I am persuaded it is a sound opinion, that the Government of this Empire cannot too constantly encourage the enterprise of travel in outlying regions, and most especially waterborne travel. A former President of the United States is reported to have said with more roughness than reverence, that if there were a bag of coffee in the mouth of an unmentionable place, there would be found a countryman of his to go and trade for it. It would not be recommendable to follow any leading to that destination for coffee or any other commodity; but in all rational and honourable maritime undertaking on the face of this planet in the pursuit of knowledge, it is a matter of high policy that this nation should lead, and strive to pass beyond the rest of mankind. Most honourable is it to the successive Boards of Admiralty, since the close of the long war, that we have done so both in the Arctic and Antarctic, for assuredly we had better have lost ten sail of the line in battle, than that any other nation should have vanquished us in those perilous investigations. Their priceless result has been the maintenance of the spirit and genius of the Navy.

The practical preliminary step which has suggested itself to me, is that Her Majesty's Government should be led to move the Governments of New Grenada and Venezuela, on the part of the Royal Geographical Society, to authorise and second the resumption of Humboldt's scientific investigations on the Orinoco and its affluents. With that permission granted, I would submit that the expedition should be assembled at Trinidad, in two or more vessels of suitably light draught and power, and set out from that island at the right time of year; regard being had to the rains, rise of rivers, &c. Immediately below the mouth of the Meta there are rapids. It is possible, however, although there is plenty of water in the narrow channels between the rocks, and Humboldt represents that there is no real danger with a good pilot, that it might be desirable for the permanent navigation of the Meta, that the line of boats should be separate, so as to avoid the rapids, unless indeed they could be easily turned by a slack water navigation.

Our situation at Trinidad, lying at the very threshold of this mightiest highway for the transit of commerce and civilisation, would greatly facilitate the steady prosecution of these deeply interesting explorations.

COLONEL SMYTH O'CONNOR, F.R.G.S., said he had resided many years in Trinidad, and had been up the Orinoco. The views of Admiral Elliot were of the greatest consequence to the British colony. He had no doubt that Trinidad, Tobago, and the other islands off the Spanish Main, originally formed part of the South American Continent, but had been torn from it by

the vast volume of the Orinoco, and divided into islands. Twenty-two years ago Colonel Hamilton navigated the Orinoco up to Angostura. At that time he was engaged with the Columbian Government, and had received near Angostura the grant of an immense tract of land, enclosed by mountains on one side, and bounded by the river on the other. He cultivated corn and a variety of other produce which he exported to Trinidad. But the chief production was cattle, reared from importations obtained from Spain, England, and Scotland, and so great was their value that horses sold at Trinidad for nearly 400 dollars, or 80*l.* sterling. That island was supplied with mules chiefly from the Orinoco, from near Angostura.

MR. JOHN LEE, F.R.G.S., suggested that the Government should send some steamers up the river to make a proper survey, and obtain statistical information as to the productions of the country. An expedition of this nature was not likely to be carried out by private enterprise.

The PRESIDENT replied that this was the course proposed by Admiral Elliot. The object of his communication was to have the subject properly discussed, and if considered desirable, that the Council of the Geographical Society should recommend the plan to Her Majesty's Government. He should like to hear the opinions of commercial gentlemen on the subject, and he thought it fortunate that they had present a gentleman of Colonel O'Connor's information to justify the application of Sir Charles Elliot.

2. *Account of the Search for the North-Australian Exploring Expedition under Mr. A. C. Gregory.* By Lieut. W. CHIMMO, R.N., F.R.G.S.

Read, Jan. 12, 1857.

FROM accounts received from Sydney, N.S. Wales, in February 1856, the Secretary of State for the Colonies had serious apprehensions for the safety of the North Australian Expedition; and having applied to the Admiralty for an officer to lead a searching party, I was selected for this mission, and with two hours' notice to prepare, embarked in the 'Royal Charter,' which was on the point of sailing for Melbourne, and made the passage—one of the quickest on record—in 59 days and 6 hours.*

On arrival at Sydney, a delay of two months occurred. I remained waiting instructions from the 19th of April to the 18th of June. After the searching party was collected and organized, I received instructions from his Excellency the Governor General to proceed in the 'Torch,' which had been chartered from her new owners, "*First*, to the Albert River, whence, after making a minute search, and feeling satisfied that they had not yet arrived there, to proceed *secondly*, to the Victoria River and render every assistance that their condition required."

On June 24th, 1856, the 'Torch' left Newcastle, after having been

* Lieut. Chimmo had just returned from Australia, where he had been employed in the 'Torch' steamer in surveying the coasts.—Ed.

crammed with 150 tons of coal, or 70 more than she had ever carried before; for which reason the Inner Route to Torres Strait was chosen, where, at all events, smooth water was certain.

On July 17th I went as close as prudent to the coast about Albany Island and Cape York, to view a spot on which I hoped soon to see an English flag. It was impossible to pass it without feeling how well adapted the island seemed for a preparatory penal establishment, or until our knowledge of the effect of the climate on European constitutions, was more truly and generally known in the depths of the Gulfs of Carpentaria and Cambridge.

Albany Island.—We first passed a bold and regular land of about 400 feet in elevation, nearly three miles long by one broad, lying in a N.W. and S.E. direction, having smooth grassy slopes with valleys of trees, terminating on the S.W. side in rocky cliffs and bold headlands, having on its N.E. side a pretty group of small islets. Here we saw but one canoe, with seven men in it.

Should an establishment ever be decided on, and which has been some time in contemplation, on account of the increased traffic through Torres Strait, for coal dépôts for steam communication, as well as a refuge for the shipwrecked mariner, which latter has become so necessary, I have not seen any spot better adapted than this, particularly in a geographical point of view, a commanding position, and exposed to a healthy brisk S.E. trade for half the year. How the N.W. monsoon affects it, I know not. Many would be the benefits arising from an establishment at Cape York or Albany Island, particularly as Port Essington, from its unhealthy site, has been abandoned.

It would benefit the natives, who may be made tractable, as at Port Curtis, Wide Bay, &c., a home or refuge for the shipwrecked sailor could be established. At present he proceeds to Booby Island, where, if his patience be exhausted, he makes a desperate effort to reach Copang. Stores of various sorts for shipping would find many a purchaser, as scarcely a vessel comes through the Barrier without loss of anchors or spars.

Cape York is not so attractive as Albany Island, and is objectionable from being partly surrounded by shoal-water bays. It is particularly barren in appearance. Fresh water is abundant in Evans Bay, two miles from Albany Island.

On arriving at Booby Island on the 18th of July, and searching all the documents in the Post Office there, it was ascertained that Gregory and his party had not passed that way on their return to Sydney. After rating the chronometers and leaving notices for any of his party who might call there, the 'Torch' sailed for the bottom

of the Gulf of Carpentaria, passing through its centre. The bar of the Albert River not allowing the 'Torch' to pass, I proceeded in her boats on the 2nd of August to ascend the river, and after a minute search of six days, came to the conclusion that neither Gregory, nor any of his party, nor the vessel in attendance on them, had, as yet, arrived there.

On arriving at the source of the river, 54 miles from the ship, we all took a searching stroll to the "plains and lands of promise," which did not present to me that boundless luxuriance I was led to expect, the whole country being parched and arid. The long grass had been recently destroyed by fire; the large gum and acacia trees, except those overhanging the river, wore quite an autumnal aspect; the land was furrowed and torn away by the deluge of rains during the N.W. monsoon; huge trees were torn up by the roots, depositing the finest of the soil in the river, and leaving on the surface a few flattened porphyritic stones, with quantities of small perfectly sound ironstone particles. Whether the fires which destroy the grass, and eventually the trees, are accidental or intentional, I cannot tell; but I believe the natives frequently set fire to the grass to seize their prey, such as kangaroos, snakes, &c. In fine, I was not very favourably impressed with either the importance of the stream or the richness of the country, although I saw it under the most favourable circumstances, the winter and S.E. trades. What it must be in the summer, during the north-west monsoon, during hot winds and changeable weather, I would hardly venture to say; the thermometer in the shade was max. 72°, min. 56°, in the sun 134° 5; the amount of ozone was 1 to 3.

I placed notices on every conspicuous portion of the banks of the river, to inform Mr. Gregory that he was not forgotten, and that we were in search of him to give him a fresh supply of provisions and ascertain his wants.

We had but one interview with the natives. On descending the river, in turning one of its bends, up started eighteen, whose numbers soon increased to twenty-eight. They were all armed with spears, boomerangs, waddies, and shields, and were exceedingly noisy and clamorous; so much so that I expected every moment to see a boomerang, which the chief or spokesman held in his hand, whirled at us. I ordered two muskets to be held in readiness, in case he should have temerity enough to throw it. They endeavoured by the most exciting gestures to persuade us to land, but this I would not permit, fearing a collision in their angry moments. I, however, made signs to them to retire a short distance, except the chief, when I would land and speak to him. This they did,

and they all sat down on a small elevated spot and watched most intently our proceedings. I then backed the boat in, and gave the chief, biscuits, pipes, tobacco, and fish-hooks. He also obtained a large coloured pocket handkerchief, which nearly distracted him with joy; wrapping it round his head and waist, and dancing most vigorously on his heels in the mud, sinking at every jump up to his knees. Their anger had now subsided, and they appeared pleased. I cannot tell what this demonstration of violence could be owing to, and I dreaded any act of hostility for the sake of those coming after us. In some of these natives I observed the loss of the eye-tooth, which indicates that they had arrived at the age of puberty, generally 16 to 17. Horizontal scars, along the body, were also seen, 5 to 6 inches in length, gradually decreasing from the chest downwards. Circumcision was also general. There were no women among them, which was a sure sign that their visit was not intended to be friendly. They followed us for 15 miles along the banks, until a creek prevented any further communication. We gave them some parting presents, including another coloured handkerchief, and they brought their weapons to barter freely and eagerly. I was glad when they turned their backs on us, evidently pleased at the meeting. Every expedition that had visited these shores had suffered from the treachery of the aborigines, and I should have exceedingly regretted if any circumstance had occurred which would have left a bad impression or kept up any spirit of revenge on those so soon to follow in our footsteps.

For 12 miles, on first entering the river, nothing can be seen but a dense mangrove bush on either side, growing on soft mud. Beyond this, the monotony is slightly changed by the elevated appearance of some gum and acacia trees. Then, where the river is deflected in a south and south-west direction, bare patches of cliff from 10 to 30 feet in height, separate the mangroves and diversify the scene. Small mangrove islets with sandy spits, at low water, appear. When nearly 40 miles up the river, a change is altogether met with; the mangroves are separated by various gums and acacias, with an occasional palm-tree. On the borders of the river, bamboos, rushes, creepers, and long grasses form altogether a dense and diversified foliage. The river is, in general, tortuous, and presents when low, a far different aspect to that at high water. Snags, sand and mud banks, embryo islets, forming round sunken logs, are, at high water, all covered, and an unbroken surface is presented.

I visited the Bountiful Island and Sweers Island of Flinders. At the former we found turtle abounding on the beach and in the

lagoons among the coral reefs, 60 of which were taken upwards of 3 cwt. each. In my notices, I informed Mr. Gregory of this fact, and recommended his sending the vessel there, if in want of fresh provisions. I also found in a hard, sandy patch, on nearly the centre of this island, the bones of five persons, who had either died of starvation or had been buried there. They all lay in the same position with heads to the north; I do not think a grave had been dug, but that the drift sands had accumulated about the bodies, and formed one grave. They had no spears, arms, or any implements near them. A few turtle-bones, shells of the *haliotus* and *helix*, were in heaps around. There was not a jaw to be seen with the upper tooth extracted, which is the custom among the North Australians when they arrive at puberty. This circumstance made me conclude they were not aboriginals, but probably a portion of the crew of the Malay proa we had found wrecked on Sweers Island. The North Australians generally bury their dead on trees, or in caves, wrapped in bark or matting, and with their heads to the east, and have always some of their war or fishing implements near them. No indications of these funeral ceremonies were near these skeletons, of which I have preserved one head for examination.

On Sweers Island, the fresh-water well of Flinders was destroyed by the natives; not, I believe, intentionally, but accidentally, from constantly running in and out to draw water. The well dug by Captain Stokes of the 'Beagle,' was also destroyed, but proving to be in the best position, I had it redug and cleared, and we obtained five tons of water from it, and left a notice also to show the Australian expedition where they would find it; planting near and about it pumpkin-seed, onions, and Indian corn. The natives were few and very shy. If they, who were watching us most intently from Bentinck Island, were surprised at seeing a ship under sail like the 'Beagle,' what must have been their wonder when they saw the 'Torch' move through the water by smoke? There was not a native seen on Sweers Island, although there were many there, and their not coming near us may be possibly attributable to fear at so wonderful a structure, moving without the aid of sails or wind.

About a mile east of this well, we found the remains of the 'Investigator's' well, completely blocked up, having only a slight undulation to mark its spot. We halted under the "tree," which still plainly bore the inscriptions of the 'Investigator' and 'Beagle,' the former carved 54 years since and the latter 15. Fortunately I had a bottle in my bag, and I made all heave-to under the tree and join in drinking with a glass of the "Queen's own" to the memory of the adventurous and intrepid Flinders, and to the health

of the next follower of his footsteps, Captain Stokes, R.N., to which was added, as a matter of course, "three cheers."

On our return to the well, we picked up a piece of a lower-deck mess-plate (china), and also a metal tray or inkstand, of European manufacture, the lid of which was gone. It is about 9 inches long, by 5 wide and 3 deep, figured on the outside with leaves of a tree that would puzzle a botanist. Such a thing could scarcely have been left there by the 'Beagle;' and if in the hands of the natives for fifty-four years would have been destroyed if left there by the 'Investigator.' The well, for which we are indebted to the 'Beagle's' visit fifteen years since, we found to be 25 feet deep, the water dripping into it through a rock of concreted lime, sand, shells, and pebbles. Sweers Island is low, thickly wooded with gums, acacias, and a straggling pandanus, and dense grass; the soil is capable of producing Indian corn, yams, cotton, &c. This, with Bountiful Island, would make good headquarters for an exploring party, and I hope Gregory will find it out.

I again passed out of the Gulf of Carpentaria, the greatest depth of which is 46 fathoms, with a soft, adhesive mud, gradually decreasing its depth from the centre to the low, muddy mangrove shores which border the east and south of the Gulf. The only phenomenon worthy of remark was the difference of the density of the sea-water at the depth of the Gulf and at its entrance in lat. 13°, amounting to 7° 7'.

On the 26th of August, we entered the Victoria River, after carefully and anxiously, but unsuccessfully, searching the north coast between the Gulfs, more particularly Treachery Bay, where the expedition first landed, and where Captain Stokes was speared and so nearly lost his life. On my first anchoring in the river, I observed a mark erected on Entrance Island, and near it a bottle containing a notice that the portion of the expedition in charge of Mr. Gregory had left for the Albert River on the 21st of June, and that the schooner 'Tom Tough' had gone to Coepang, in Timor, for repairs.

It was now very evident that my detention for two months at Sydney, might be seriously felt by the expedition. Had I set out on my first arrival, I should have been in sufficient time not only to supply the party with provisions, stores, and despatches, but also to have discharged the schooner and have acted in concert with Gregory, in a steamer, until the completion of his mission.

I proceeded 60 miles up the river in the 'Torch,' and then 40 miles farther in the boats, to Gregory's abandoned camp, where I found another notice of his movements.

After replacing these notices, and leaving one of my intended movements, for Gregory or any of his party, I retraced my steps to the ship, and found that while the crew were watering ship they beheld an interesting relic of the 'Beagle.' Inscribed in large letters on a tree nearest the well, were these words :—

"This river was discovered, by the officers of H.M.S. 'Beagle,' on the 18th Oct., 1839, and was named the 'Victoria,' in honour of Her Majesty, the Queen of England."

Here I had the good fortune to find the rare and interesting bower-bird's nest (*Chlamydera nuchalis*) among the mangroves, and scarcely above high-water mark at springs.

On arrival at Gregory's camp, 6 miles below Steep Head, we found it looking like an English farmyard, with thatched houses, huts, sheep-pens, horse-sheds, forge, oven, &c. The spot was well selected. We landed on a pier formed of large stones and pigs of ballast. In our road lay iron hoops, rope, tubs, buckets, old clothes, Indian corn, old boots and shoes, pieces of harness; and we came to the oven, in the interior of which, protected by four pigs of iron ballast, was a bottle, containing a notice to the following effect :—

"Camp, Victoria River.

"On Saturday, 21st June, 1856, the exploring party of the N. A. Expedition, consisting of seven persons, left this camp, on their way to the Albert River, in the Gulf of Carpentaria; and on Wednesday, July the 2nd, the remainder finally abandoned the camp and proceeded down the river to join the schooner 'Tom Tough,' which had dropped down to Shoal Reach about three months previously. The vessel will sail, as speedily as possible, to Timor, whence, after obtaining supplies, she would proceed to the Albert River, and the detachment of the Expedition on board will form camp and await the arrival of Mr. Gregory. Subsequent information will be left on Entrance Island.

"John Finlay, carpenter of the schooner, died April 22nd, 1856, and is buried near a gouty-stem tree, marked, with the dome, bearing W.N.W. $\frac{1}{4}$ a mile (Tuesday evening the 1st of July).

"The finder of this document will greatly oblige the Expedition by giving it every publicity, and, if possible, by forwarding it to his Excellency, the Governor of New South Wales, or to any other of the Australian colonies.

(Signed) "T. BAINES."

After perusing this, we went to the forge, where another paper was buried, containing a similar notice. We returned to Mr. Gregory's hut, and, having drank success to his expedition, read all the interesting notices over and over again.

I passed an hour at the camp, admiring all the arrangements. It

consisted of seven thatched houses, three huts, some sheds for cattle and sheep-pens, two deep and good wells, and an entrenchment all round. No natives had been near the camp since Gregory's party left. A road was cut several miles, in a S.S.E. direction, as straight as an arrow. I sat down at Gregory's table, and penned a notice, after placing which, and while the men were getting their dinners under a shed, I amused myself by sketching the camp from Baines's window, as it was too hot to venture out to do so. The boat's crew, having found a small pot of black paint, inscribed some amusing notices outside the doorways. On the door of Mr. Baines's hut, after I came out, I saw hanging on a board,—“Victoria Hotel. Good Beds, &c. Ginger Beer and Refreshments.”

The evaporation in this river is very excessive, amounting to 13° between the wet and dry thermometers. The backs of all our books parched and curled in every shape and form. A boxwood ruler, on my table, warped 3-8ths of an inch in 24. A boxwood thermometer, 3-8ths of an inch, warped 1-10th, threatening to break the glass tube.

Coming out of the Victoria River, the ‘Torch’ struck on a bank, where at low-water her keel was 7 feet above the low-water line. This bank has accumulated from the strength of the tide, consequent on a rise and fall of 24 feet, since Captain Stokes's survey in 1839, when he found $\frac{1}{2}$ fathom at low-water springs.

I had intended to make a few remarks during my week's visit to the Victoria River, but Captain Stokes gives so excellent a description of it, that it is unnecessary for me to do so.

Finding that the schooner had only left six weeks since for Coepang, I made all haste after her, but, on arrival there, found that she had been sent to Surabaya for docking and repairs.

At Coepang, I received a request from Mr. Baines to proceed to the Albert River, but as at the same moment Mr. Baines might be starting from Surabaya in another chartered vessel, and we should consequently be sailing side by side until anchoring off the mouth of the river, and then find that two vessels were performing one and the same service, I, the next morning, started for Surabaya, still with a hope of communicating with him. On my arrival there, however, I found that this section of the Expedition had started in a new chartered schooner on the 31st of August; and, from her being a well-found, substantial vessel, she would reach the Albert River about the end of October, long before the Expedition could suffer any privation from hunger.

The PRESIDENT returned the thanks of the Society to Lieut. Chimmo. He rejoiced that they had among them a gentleman who had come back from fol-

lowing the expedition, and had brought home some additional information of importance. It appeared to him that there was a lapse in the paragraph as to no other ship but the 'Torch' having been in the Gulf of Carpentaria; it could not have been the intention of Lieut. Chimmo to say so, after the voyages of Flinders and Stokes.

LIEUT. CHIMMO replied that all former vessels had only coasted the Gulf, without examining its centre.

The PRESIDENT was afraid that without this explanation, it might be supposed that the region had not been properly explored.

MR. JOHN CRAWFURD, F.R.G.S., had listened with great interest to Lieut. Chimmo's spirited account. In his opinion it was a very correct one, and one of sound judgment. In describing the country at the mouth of the Albert River as very arid, hot, and sterile, he showed it to be wholly unfit for colonisation by Europeans; and therefore, he concluded, wholly unfit for a penal settlement. This opinion, Mr. Crawford said, he had stated at a very early period, and he thought Lieut. Chimmo's account most perfectly confirmed it.

DR. HODGKIN, F.R.G.S., inquired of Lieut. Chimmo whether the natives at the mouth of the Albert River resembled those of Southern Australia. He had the opportunity of seeing two who were brought to England by accident by Captain Strickland, about eighteen months ago. They were tall and slender, and appeared to be friendly disposed. One of them died, and in taking the other back Captain Strickland took considerable pains that he should convey to his countrymen a friendly feeling towards the whites. It appeared that Lieut. Chimmo did not find them well disposed. Dr. Hodgkin said he was also struck with the fact of their being seen in a canoe that carried five or six people; the natives generally were so little competent to perform any work of art that the construction of a canoe of this size indicated an advance which rather surprised him.

LIEUT. CHIMMO replied, that the natives at the head of the Gulf of Carpentaria were the wildest people he ever met in his life. He was not favourably impressed with the Australian race. On a previous occasion he took nine of them from Percy Island to Sydney—the murderers of Mr. Strange, the Government geographer. He had seen canoes at Percy Island, that carried five or six persons.

The PRESIDENT said, much as the Society had been interested in the success of this expedition, and warmly as they had instigated the Government to pursue it, yet they had had no sort of control as to the conduct and progress of it. The Society was not in any way responsible, farther than for recommending certain gentlemen who had gone out as scientific members of the expedition, and who had performed their duties admirably.

3. *Proposed Communication through North America, from Vancouver Island to Hudson Bay.* By THOMAS BANISTER, Esq.

THE routes proposed by the Americans to the southward of the 49th parallel of latitude, as contained in the 'Report of the Secretary of War on the several Pacific Railroad Explorations,' are five in number, and are enumerated in the following order, proceeding from north to south:—*First.* The extreme northern route (Major Stevens's) between the 47th and 49th parallels of latitude, and striking the Pacific at Puget Sound. *Second.* The route of the 41st parallel (Mormon route) by the South Pass, or Great Salt Lake, to San

Francisco. *Third.* Route of the 38th parallel, or Benton's. *Fourth.* Route of the 35th parallel (Rusk's) to San Pedro, on the Pacific. *Fifth.* Route of the 32nd parallel, or the extreme southern route, *viâ* Texas and New Mexico, to the Pacific. The third and fourth routes are considered next to impracticable; while the three others are attended with great difficulties and expense. Mr. Banister considers that the routes through British North America are not only the most practicable, but also, in a national point of view, the most important. He proposes starting from Fort York on Hudson Bay, and proceeding westward as far as Puget Sound, opposite Vancouver Island. The Hudson Bay Company have certain interests, but the Crown has never abandoned its sovereign rights over these territories. The Company deserves credit for its conduct, and for important things it has carried out; but the time has arrived for the Government to consider, whether the interests of the empire do not demand a reconsideration of the whole subject of the colonisation, &c., of the regions on the west coast of America from Hudson Bay.

MR. BANISTER had derived information from a gentleman who had been many years in the employ of the Hudson Bay Company, and had passed along the line, as well as from others acquainted with the country. He had been induced to make the proposition by the great demand for a passage across North America, evinced by the efforts made by the Government of the United States to find such a passage in their own territory; and he looked at the question as it affected British interests. The late proceedings in Canada, the opening of the Grand Trunk Railway, the passage into Lake Superior and Lake Michigan, the rise of Chicago, a city of yesterday, with a population of 100,000 inhabitants—all showed the rapid advance of those regions. The evidence was all in favour of the northern country becoming habitable. The travels of Sir George Simpson, Sir John Franklin, and others, were conclusive as to the richness of the country in mineral as well as agricultural produce. A gentleman, Mr. Low, had informed him that the natives on the eastward of these mountains possessed horses, and lived out in the open prairie in winter. Horses would not exist on the east coast, and that was a proof of the mildness of the climate in the interior. He was satisfied that the evidence was in favour of the necessity of the line he had proposed; and he brought it forward with the view of the Society inducing the Government first to take measures to ascertain the practicability of the country; secondly, if practicable, to decide upon establishing the line of communication; and thirdly, to devise the mode of carrying the scheme out.

The PRESIDENT was of opinion that the communication opened out very broad and important views for the consideration of geographers and statesmen. The meeting was, fortunately, attended by gentlemen who were well acquainted with these portions of North America; and with reference to the boundary line, the 49th degree, they had recently brought before them a project from Mr. Palliser, which had already been approved by the Council, for an examination of all the region from that line to the Saskatchewan, as well as the rocky and elevated region to the west of the Prairies, in order to see whether it be practicable to form a good road for British subjects without deflecting into the American territory. Mr. Palliser was in the room; and, having lived a

good deal in the country, must be able to speak to the practicability of the proposed route, as well as of forming railroads. They had also present Colonel Lefroy, who was twelve years in Canada; he had enriched science by magnetic and other observations, was an admirable geographer, and well acquainted with these regions. It was seldom they had the opportunity of having a subject better discussed.

COLONEL LEFROY, F.R.G.S., said, that Mr. Banister's scheme proceeded on the assumption that whatever was not physically impossible, was commercially possible. There was certainly not a physical impossibility in the formation of this railway; but it was under conditions entirely different from those which attended the formation of railways in this country. Mr. Banister began by pointing out the analogy of Hudson Bay with the Baltic. The Baltic had its inlet on the south, Hudson Bay on the north, which made an important difference. Hudson Bay could only be entered two or three months in the year, the Baltic at all times. In ascending between Fort York and Lake Winnipeg, the traveller passed over a rugged and difficult country, of a spongy nature, 900 or 1000 feet high, until he came to Lake Winnipeg, which was itself 800 feet above the level of the sea. He had then to go through a region without inhabitants—for the whole population of this vast internal region did not amount to 100,000 souls—and then to pass over the Rocky Mountains. The general character of the country up to the Rocky Mountains was a plain, ascending gradually, intersected by extremely deep rivers. There would be some tremendous bridging required. A part of the district, which must necessarily be passed, was a mere spongy, elevated table-land, from which rivers took their source in all directions. It was not physically impossible to carry a railroad there, but it would not be commercially possible. Passing over the Rocky Mountains, the traveller arrived at Fort M'Leod, considerably on the west side of the mountains. That fort was the nearest station to the Hudson Bay Company's line on the Pacific; and such was the difficulty of communication, that the hardy traders in the employ of the Company, though they had been trying several years to establish a communication with Fort M'Leod from the west, had never, down to the period in which he visited the country, —1843-4,—succeeded in doing so. All these were reasons why he thought this railroad, which had been urged on general grounds as a great necessity, was not likely to be realised in our days.

The REV. MR. NICOLAY, F.R.G.S., agreed with what Colonel Lefroy had said with regard to the northern and western portions of the country near the sea. Although a railroad would be scarcely desirable in the direction indicated, there was no reason why, in the time of our children, if not in our own, one should not be carried across the plains to the south of the river Saskatchewan. As far as he was aware, he believed no Englishman had ever crossed those plains to the north of 49° directly to the Rocky Mountains. He hoped Mr. Palliser would be the first to do so. Supposing there should be no impediment in that direction, there would be no difficulty in crossing the Rocky Mountains. The pass indicated by Mr. Banister had been more than once traversed by the officers of the Hudson Bay Company, and he believed there were some in the room, who had traversed it themselves; it was not the best. From the account of his journey, given by Sir George Simpson, there seemed to be two distinct ranges between which the river Kutani flowed to the south. There was a pass to the south, leading into the valley between the two ranges, over which the emigrants mentioned by him crossed—whether to the south or north of 49° he was not prepared to say; but that there was an easy pass in that direction was well known. The difficulty in crossing from the northern of these passes to the Pacific, as Colonel Lefroy remarked, was no doubt very great. All this country was covered with small lakes—a network of lakes and rivers, which at certain seasons must be untraversable, and it must be centuries

before it could be inhabited. But the country to the south and east of the northern branch of the Columbia was, he apprehended, of a very different character. Whether it was a country through which a railroad would be carried in our time, was another question. As to the desirableness of opening up a communication with Vancouver Island all would agree, especially as the Canadians began to feel cooped up, and wanted a way to the west. The value of Vancouver Island was becoming better known, and he anticipated great advantages, commercial and otherwise, to result from Mr. Palliser's explorations. The plains to the south of the Saskatchewan might supply Europe with corn, brought down to Hudson Bay. A home voyage once a year was quite another thing to keeping up a constant communication.

COLONEL LEFROY said with reference to the exportation of articles from the Saskatchewan, there was a considerable amount of import and export going along that line, inasmuch as all the goods brought in by the Hudson Bay Company were carried by that route, as well as the furs which they obtained in exchange. The price of the inland freight from York-Factory to the Red-River Settlement, was 18*l.* per ton, when he was in the country.

MR. J. PALLISER, F.R.G.S., was inclined to think there was no pass known within the English territory, except the Athabasca portage, which was considerably to the north. There were two passes to the south which he believed were both in the American frontier. Even Sir George Simpson himself, who took the more northerly of the two, passed within the American frontier. Still he had heard from conversation with the hunters and trappers—Red River people—that there was a pass in the English territory; but he had only their word for it. He crossed the frontier when he was at White-earth River, the most northern part of the Missouri. But with that exception his wanderings and hunting adventures were on the American side. Still, all the nations in that part of the country might be said to belong to both English and United States territory. For instance, the Assineboins, the people he had most dealings with, wandered on both sides of the line. Also the Black Feet and the Minatorees wandered backwards and forwards, though their country was strictly speaking confined to the American side. The Indians seemed to have a very great respect for the English. Whenever he was pointed out as an Englishman, they used to pay him a sort of additional respect.

MR. BANISTER, in reply, said that early last year he had been appointed agent to parties in Vancouver Island, which brought him in connection with a great number of persons who were intimately acquainted with the interior. The natives on the coast of Queen Charlotte Islands were a very superior class of people, in proof of which he would put into the hands of the President a piece of sculpture cut from the tooth of a walrus or something of that sort. The men of these islands were almost white. They were very robust. They made fine sailors, as good as the New Zealanders. On one occasion they brought down a vessel commanded by an Englishman. With regard to a pass being found for the transit of merchandise within British territory, it was a matter of great importance, and might throw the carrying trade between California and the Atlantic States into our hands. The trade depended on the termini of the route, rather than on the country through which it passed. At all events the inquiry was well worthy of being made. A gentleman in a letter to him stated that there was a pass up the Fraser River, where the mountains fell away, that it was a very narrow passage without any obstructions, and led into the valley of the Peace River. The communication, he proposed, might not be entirely by railroad as in England, but partly by railroad and partly by other means. In order to carry out the work, he did not see why the Government should not employ criminals, and thus make them the pioneers of civilization.

MR. PALLISER thought it must depend upon astronomical observation to

determine the position of the passes adjacent to the frontier. There were two passes close to one another, and the question was whether they were not both within the American frontier, or whether one might not be within the English territory. It was a very nice point to determine. As to what had been said about the natives of Vancouver Island, he thought the people of the western coast were very different from those on the eastern side, and resembling more the Polynesian race.

The PRESIDENT said they had to thank Mr. Banister for having brought the subject forward. It had given rise to an excellent discussion, that had thrown much light upon a subject of the greatest importance to every Englishman. The practicability of railroads was a subject incidental and collateral. Their first great point was to determine the physical geography of the region—therefore the projected exploration would be of considerable value, as it would set at rest whether there was a practicable route across the Rocky Mountains or not. He was glad to see Mr. Palliser, who from his acquaintance with the country, his skill as a sportsman and the good use he made of his opportunities, was capable of exploring these difficult regions—he was delighted to see him sitting next to the great explorer of Africa, Dr. Livingston. These were the gentlemen who found out the paths, by which civilization could be advanced in these distant and difficult regions. Railroads, however, must fall in afterwards. In the first instance they had to determine the geography of the Rocky Mountains, with which the world had made little or no progress since the days of Mackenzie.

Sixth Meeting, Jan. 26, 1857.

SIR RODERICK MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS.—*Robert Benson, William Benson, C. L. Gruneisen, John Costerton, and J. L. Statham, Esqrs., were officially introduced upon their election.*

ELECTIONS.—*Capt. Hartstene, of the United States Navy, recently in command of H. M. S. 'Resolute,' was elected an Honorary Member; and Dr. Alexander Armstrong, R.N.; Capt. John Baillie, Bengal N.I.; Capt. Thomas Blakiston, R.A.; the Marquis of Blandford, M.P.; Dr. W. F. Cumming; Dr. A. T. Chalmers; Capt. L. R. Elliot; Lieut.-Col. P. Faddy, R.A.; Hon. G. Fitzclarence, R.N.; Thomson Hankey, Esq., M.P.; Capt. W. A. Pope; the Hon. Stephen E. Spring Rice; Sir Macdonald Stephenson, C.E.; Capt. B. J. Sullivan, R.N., C.B.; Col. J. Temple West; the Right Hon. J. Stuart Wortley, M.P.; Capt. Henry J. P. Woodhead; and C. T. Arbuthnot; Richard Blanshard; John Utlay Ellis; F. L. Evans; T. H. Farrer; Z. D. Hunt; George Lee; Edward Sullivan, and Richard H. S. Vyvyan, Esqrs., were elected Fellows.*

DONATIONS.—Among the principal donations received since the former Meeting were, several Russian maps, and the Sardinian Staff maps of the Crimea, presented by Felix Wakefield, Esq.; the Ord-

nance maps of all the counties of Ireland, on the scale of six inches to the mile; together with general maps of Ireland; Black's Atlas of North America, presented by the publisher; Atlases of heights, by J. M. Ziegler, Corresp. F.R.G.S.; with the Transactions of the Darmstadt Geographical Society, of the Hakluyt Society, &c.

ANNOUNCEMENTS.—The Sixth Number of the 'Proceedings,' published that day, would be distributed to the Fellows by Mr. Stanford, of 6, Charing Cross.

The Papers read were:—

1. *Extract from a Letter addressed by TH. MACLEAR, Esq., H. M. Astronomer at the Cape, to the Secretary.*

“ Royal Observatory, Cape of Good Hope,
Nov. 3, 1856.

“ The object of this letter is to report progress in the reduction of the astronomical observations, which that remarkable and excellent man Dr. Livingston, made for geographical positions, on his track from Loanda across the continent to Quilimane. He has sent them to me for reduction, and I am anxious that they should be in Sir R. Murchison's hands, according to Livingston's request, with the least possible delay: or rather, I am anxious that they should meet him in England at the right time—the time when the Society and the public at large, will be doing him due honour for services without a parallel.

1. To expedite the reductions, I had skeleton forms printed for the computation of *time from altitudes*; for *altitudes from time*; and for *Greenwich time from the lunar distances*.

2. His observed lunar distances were compared (roughly) with tabular lunar distances, in order to detect errors of date as to the day of observation—a common source of error where civil clashes with astronomical reckoning.

3. The watch-error was computed from each altitude, whether observed for watch-error or for the calculation of parallax and refraction, to detect errors of entry or of transcribing; and while this was going on, another computer was following closely, calculating the parallaxes and altitudes for the times of lunar distance measures.

The total number of altitudes computed for time is 214, exclusive of repetitions or checks.

To this point the reductions were brought up on Saturday. To-day we commence the lunar distances, which will be computed by the rigorous trigonometrical process, viz. the final computation;

for I find they must be repeated, as the assumed longitude sometimes is a degree in error; therefore at least two, but generally three, approximations will be needed.

Thus you will perceive that the only residual errors will be chargeable to the eccentricity or index-errors of the sextant, and to the errors of the lunar tables; and as Livingston unfortunately did not visit the Cape, I have had no chance or opportunity for examining the instrument.

I do hope that Livingston's merit will be acknowledged by the Crown in a substantial form. He is a poorer man than he was fourteen years back, when he landed in Africa. Without reference to higher motives, he has rendered services to science, and perhaps to commerce, such as few men have rendered. His constitution has been seriously injured by thirty-one attacks of fever. In fact, it would be difficult to find another whose claims on public gratitude are so strong."

Yours, dear Sir, truly,

T. MACLEAR.

Dr. Shaw, Secretary of the Royal Geographical Society.

2. *Notes on the Geography of Burma, in illustration of a Map of that Country.* By Capt. YULE, of the Bengal Engineers, F.R.G.S.

IN 1855, Capt. Yule had been sent by the Government of India to Amarapura, as secretary to Major Arthur Phayre, then proceeding on a mission to that Court. In drawing up a report of the mission and of the information collected by its members, he had found a new map of the country to be much wanted in illustration of his subject, and this had led him to undertake the compilation in question.

The paper gave some account of the history of the geography of those countries, to which shape was first given by the mission of Col. Symes in 1795; and especially by the collections of Dr. Francis Buchanan, who accompanied that mission. The most important additions to our knowledge were made by the journeys and surveys of various officers, especially of Wilcox, Grant, Pemberton, Richardson, Hannay, and Macleod, between 1826 and 1837. The revolution at Ava, in the latter year, interrupted all such acquisitions for many years.

Some of the chief materials used in the new map, were, a survey of the new British province of Pegu, undertaken by Lieut. Williams, of the Bengal Engineers, and still in progress; a new survey of the province of Martaban, by Mr. Hobday; a survey of the river Irawady to Ava, by Capt. Rennie and Lieut. Heathcote of the

Indian Navy; a sketch of part of the Aracan Yoma range and its passes, by Capt. Yule; and a re-arrangement of the Chinese frontier and the Shan (or Laos) states, east of Burma, from the route-surveys of Dr. Richardson and Capt. Macleod, with additions from other sources.

A considerable error in the longitude of the Irawady at Prome and upwards, as assigned in previous maps, was pointed out. The existence of this error had first been indicated as probable by Capt. Yule, in a memoir on the Passes of the Yoma, submitted to the Government of India in 1853. The surveys since made, have confirmed this indication.

A sketch was given of the political division of the Burmese countries at four remarkable epochs, viz., circa 1500, 1580, 1824, 1854, illustrated by four comparative diagrams. In the first, these regions were shown as divided into numerous kingdoms and principalities, of which the chief were Ava, Pegu, Aracan, Toungu. In the second, Pegu was shown as predominant over nearly all. In the third, Ava had reached the climax of its power, and reigned over a territory, extending from the British district of Rungpur, on the Brahmaputra, to the great river of Cambodia eastward, and to the island of Junk-Ceylon southward, with a seaboard of 1200 miles. In the fourth, Ava was shown again contracted, and cut off from the sea in all directions, by many leagues of British territory.

After a sketch of the natural mountain-boundaries of Burma, the paper proceeded to the detailed descriptive geography of the country, from the upper course of the Irawady downwards to the sea, including the British province of Pegu and the passes of the Aracan Mountains.

An attempt was then made, from various data, to estimate the population of the Burmese empire. The general conclusion was, that the population of Burma *proper*, say from lat. 24° down to our Pegu frontier, is about 1,200,000, or less than 25 to the square mile; and that the population of the whole Burmese empire now probably does not exceed three millions. This does not differ materially from the estimate formed by the sagacity of Mr. Crawford, on the more imperfect data which were available to him in 1827.

An additional section of the paper gave a detailed sketch of the Shan principalities, on the eastern frontier of Burma, respecting which it is believed that no very lucid statement has yet been brought together in print. The chief authorities for this sketch were the journals of Dr. Richardson and Capt. Macleod, in the records of the Foreign department at Calcutta. These have never been published in full, as they merited to have been.

A selection of excellent photographs of Burmese buildings and scenery, by Capt. Tripe, of the Madras army, was exhibited in illustration of the paper.

The PRESIDENT said the Fellows would agree with him in thinking this a most valuable contribution. Captain Yule had brought before them a very large, graphic, and at the same time, he presumed, a very exact view of this country. Capt. Yule had examined considerable portions of the country, and had combined together and collated, as he thought, with singular ability and acumen, all the valuable documents of his precursors. He expressed in his concluding paragraph, that it was much to the credit of the Burmese, with so small a population, to have maintained their empire there, and he might add that it was much to the credit of an eminent geographer present (Mr. Crawford), that he should have made such a just estimate, so many years ago, as to the population of the country. No person he knew had a higher opinion of the talents displayed by Mr. Crawford in his work upon Ava, than Captain Yule; and it was gratifying to know that Mr. Crawford was present to testify to the accuracy of the statements before them. Not only had Captain Yule corrected a great number of erroneous views with respect to the longitude of different tracts, and given the general features of the physical geography of the country, but he had also given some very interesting comparative views of the condition of those vast regions at different periods of history. Captain Yule could have brought before them much more that would have been amusing. There was on the table a portrait of his Majesty the King of Burma, who received the English Mission eating "paw," a substance which his Majesty continually put into his mouth, and chewed so continuously that it was difficult on the part of the Mission to understand what he addressed to them. There was also a view of the celebrated white elephant, which had an entire district assigned for his maintenance. Another view represented the king, with his queen smoking a cheroot in her chair of state, and the British Mission at a respectful distance. Captain Yule had called attention merely to the great geographical features of this region, and to its history, and he had done so with singular ability. He was very glad that his short absence from his post in India, where he was actively employed, had enabled him to communicate so much knowledge to the Royal Geographical Society.

MR. J. CRAWFORD, F.R.G.S.—By the favour of the President he had had the pleasure of reading Captain Yule's Report of the Mission to Burma. It seemed to be printed, but not published. Why, he really did not know, for it did great credit and great honour to everybody concerned—to the nobleman who made such an excellent selection of persons to fulfil that mission, and above all to Captain Yule, who was the principal writer of the volume, assisted by a very able geologist, Mr. Oldham. That book ought to have been published. It was public property; the public had a right to have it: and he hoped it would be published. Major Phayre and Captain Yule had gone over the ground, that he went over himself thirty years ago. They had done great justice to all the parties that went before them, to himself more than justice in most respects, although he had a few trifling comments to make upon some portions of the volume. He held in his hand a passage which, perhaps, they would permit him to read:—"Mr. Crawford appears to have been rendered weary, hopeless, and disgusted, by the arrogance and impracticability of the Burmese ministers, and excepting on one point—the payment of indemnity money—made deplorable concessions." Now, he was not aware that he made any concessions at all, deplorable or otherwise. In his own humble opinion he maintained a meritorious amount of obstinacy. He yielded nothing, absolutely nothing. Very great demands were made upon him. The Burmese negotiators demanded

that we should restore all the territories we had taken from them in our successful war of 1826. He did not yield them a single foot: he did not give way in one point of ceremony; nor in any one essential point whatever. Captain Yule had not stated what these deplorable concessions were; therefore he was at a loss to understand what they meant. There was also a foot-note in which a strange sort of charge was made against him:—"When the king on one occasion of Burney's residence, had two of his confidential ministers dragged out and flogged with a rattan for some trifling fault, Mr. Lanciego, an old Spaniard who had been long in the Burmese service, told the resident that the Atwen-woons had only got now what they were once very near getting from Mr. Crawford, who in the heat of one of the conferences, started up and threatened in English to give the Burman negotiators a round dozen a-piece."* He did not mean to say that the Burmese negotiators did not deserve a round dozen a-piece, but he certainly was not the person who proposed to inflict it. He did not threaten the king's ministers with a flagellation, but they intercepted his despatches, and they brought the very individual who opened them into his presence, in the pavilion in which the negotiation was going on. He got up and told them, they ought to be ashamed of themselves, to bring that man into his presence, and he ordered him out of the pavilion, and told them that instead of exhibiting him in that shameless way, they ought to give him a round dozen. Perhaps Captain Yule would omit these passages when he published his important work. There was one point that Captain Yule did admit, that he (Mr. Crawford) paid some attention to the main chance. He did; he would not remit one farthing of the tribute. It was a large sum, a million sterling, a sum not to be trifled with. There were many matters contained in the volume, upon which he could make some observations. The Burmese country very much resembled a great section of America when first discovered—a very remarkable circumstance. There were numerous tribes that had come under the notice of Captain Yule, who were in various social conditions, and speaking distinct languages. All these languages were monosyllabic; every one of them consisted of a single syllable: the people had never been able to put two syllables together, except some foreign words which they had acquired. Our own "fee, faw, fum," was a joke to what they put forth as speech. With respect to the Mission having a permanent location at the Burmese court, Lord Dalhousie had the good sense not to send one. He had been appointed to reside there, and he had seen the impolicy of it. The Indian government persevered for ten long years, and Captain Yule knew what had been the result. Colonel Burney went, but he was absolutely driven out. A successor, Colonel Benson, followed. The Burmese kept him on a sand-bank four months. The Indian government then gave it up, and no embassy was sent afterwards. He would make the same representation to her Majesty's government, and also to the government of the French emperor, who he was told was about to send an embassy to Peking. It would never be established except by the force of cannon; and when established it would be found useless, and the envoy would be made as miserable as possible.

CAPTAIN SHERARD OSBORN, F.R.G.S.—He observed there was a river eastward of the Irawady, which appeared in the charts to be connected with the frontiers of China. Was Captain Yule in any way acquainted with the source of that river?

CAPTAIN YULE.—That river is the Salween. No one knew the source of it. As shown in d'Anville's maps, it came from the north of Thibet. He did not believe that it came from that extreme distance. No one, however, had ascended above the British frontier, and no one knew anything about it, except that it was rocky, and navigable only for small canoes.

* See Yule's Narrative of Major Phayre's Mission to Ava, p. 233.

The PRESIDENT called attention to the geological portion of the work, as communicated by Mr. Oldham, the superintendent of the Geological Survey of our dominions in India. He was associated with Captain Yule in surveying the country, and the concluding part of the volume contained a great deal of important information with respect to the structure of the country, the rocks, and all their relations. The work was rendered additionally valuable from its observations on the statistics of the productions of the country, including the mineral productions with the observations of Mr. Oldham.

MR. CRAWFURD.—He ought, in justice to the nobleman who obtained this annexation of Aracan and Pegu, to mention an important fact respecting them. It was well known that Bengal—rice-producing Bengal—was a densely peopled country. The consequence was that the price of rice had been constantly rising. Aracan and Pegu were countries of a totally different description. They were unpeopled. Captain Yule did not estimate the population at above 25 inhabitants to the mile, whereas there were some portions of Bengal which contained 600 to the square mile. There was a great abundance of fertile land in the valley of Aracan. The price of corn and rice was regulated by the quantity of land of the first quality, capable of producing it. All the land at present in use in Aracan for the production of rice, was of the first quality. The result was that the export of rice from Aracan alone, though a country of but 10,000 miles in extent, was greater than the exports from all Bengal together. In former times the settlements to the eastward—Penang, Singapore, and all the countries in that direction—used to be supplied by Java. The policy of the Dutch, by displacing rice and encouraging other productions less profitable to the people, had been such as to enhance the price of rice to such an extent that these districts were now supplied from Aracan. A very large amount of the rice of Aracan was also exported to Europe, to the value of one million sterling annually, as he had been informed by a merchant connected with the trade. These facts showed that our Burmese possessions were likely to become important countries.

3. *Journey across the Kuen-luen from Ladák to Khotan.* By the Brothers SCHLAGINTWEIT.

Communicated by Col. W. H. SYKES, V.P.R.G.S., etc.

PROCEEDING from Ladák, through Nubra, to the Pass of Karakorum, we were able to pass the frontier of Ladák, and to extend our observations over very nearly the whole breadth of the Kuen-luen Mountains. We estimate (not yet having reduced our astronomical observations of latitudes and longitudes) the distance we travelled in Turkistan, before returning again into Ladák, to be very nearly 300 English miles.

We left Ladák July 24th, 1856, went by Laoche Pass (17,600 feet *) to the valley of the Shayuk and Nubra; from Nubra we crossed the Sassar Pass, about 17,500 feet. We stayed two days on the Pass itself to make magnetic observations and to enable us to

* All the heights in this Report are only approximately correct. Very good corresponding observations were taken at Ladák, but we have not yet found time to make the necessary calculations.

reach the summit of the Sassar La—20,000 feet—from which we had, as we anticipated, a very extensive and interesting view of the large groups of glaciers surrounding the Pass, one of the largest accumulations of glaciers in the Kuen-luen.

From the Sassar Pass, our route brought us to the large plateau to the south of Karakorum, the mean elevation of which reaches 17,000 feet. On the 9th August we crossed, without any difficulty, the frontier of Turkistan.*

We were accompanied by Mani, the Putwaree of Nilum; by Marshoot, a former servant of Moorcroft; and by Mahomed Amir, an aged Turkistani, whom we found particularly useful on account of his general knowledge of the country.

We had besides, six horses for ourselves and servants, thirteen for baggage, five Yarkandis, and some fifteen sheep and goats.

The Yarkandis, with horses and provisions, we sent on, and we only met them by chance at Nubra.

Our servants from the plain, accompanied us as far as Sassar, from whence we travelled dressed as Yarkandis.

The day before we passed the Karakorum, at 18,300 feet, we met a large caravan of merchants from Yarkand, to whom we gave out that we intended to march on the Yarkand road, but, as soon as we had passed Karakorum, we left this road and went to the east of Kizilkorum, 17,400 feet, the high-water parting between Yarkand and the Karakash river. In one day we crossed four passes, exceeding 17,000 feet above the sea, but only slightly elevated above the surrounding plateaus.

From Kizilkorum, we followed the direction of the principal chain of the Kuen-luen, now turning to the south-south-east, till we reached a lake, Kiuk-kiul, slightly salt, situated at the northern foot of the Chanchcumo.

Up to this point, our route had chiefly led us over extensive plateaus 16,000 to 17,000 feet above the level of the sea, of a much greater extent than those to the south of Karakorum; but from the lake we followed the valley of the Karakash river, to the right of which there are no plateaus, while to the left they extend as far as Suget.

The sterility of the plateaus to the north of Karakorum, as well as of the Karakash Valley, is quite surprising; and without the frequent, though not very abundant showers, chiefly caused by the

* See Journal of the Asiatic Society of Bengal, No. IV., 1856, p. 344, for Travels in 1852 from Cashmere through Yarkand, Kokan, Bokhara, and Cabul, in search of Mr. Wyburd.—Ed.

great elevation of the ridges, these plateaus would be complete deserts.

In a march of 18 miles, we only met with four species of plants; for many days grass was exceedingly scarce, while for several days we had absolutely none, the grass round the Kiuk-kiul Lake being the only exception. We had taken comparatively a small supply of grain, anticipating in some degree the sterility we met with, which saved our horses from absolute starvation; nevertheless they suffered dreadfully, the more so as the scarcity of grass compelled us to make long marches of 20 to 24 miles a day. Close to the Kiuk-kiul we met with a very interesting group of more than fifty hot springs, chiefly containing muriate of soda and a great quantity of carbonic acid; their temperature varied from 77° to 120° Fahr.

We had already met, in the Valley of the Nubra, with two other groups: the one near Panimik (hottest spring), 78.1° ($= 172.6$ F.), the other near Changlung, 74.1° ($= 165.4$ F.).

After a march of 70 miles in four days, we came to Pumgal, where a route branches off by the Valley of Bushia to Elchi, the capital of Khotan.

From Pumgal a road branches off, as mentioned above, to Bushia and Elchi; and as there was some hope of procuring at these places fresh horses or yâks, as well as food, our men were easily persuaded to proceed towards them. We started August the 22nd, with only two laden horses, and had to cross a glacier pass of 17,000 feet, where, at 10 A.M., we were overtaken by a violent snow-storm, lasting till 6 P.M. The road was extremely difficult for the horses, on account of the number of fissures in the glaciers.

In Bushia, which we reached two days later, on the 25th August, we met with a very cordial reception from the inhabitants, and got horses, yâks, sheep, and provisions, on the promise of payment in Pumgal.

These people—half-nomadic Tartars—appeared very honest, and the prices they asked were certainly moderate. They inhabit caves, fitted up like houses in the cold season, and tents during the rest of the year. The height of Bushia is 9200 feet. We had taken the precaution of dressing ourselves like the inhabitants, and had also learned the necessary forms of salutation, for the people here are far from being savages, but are, on the contrary, very ceremonious. They took us—never having seen any Europeans—for what we represented ourselves to be—merchants from Delhi. Elchi, the capital of Khotan, was only two days' journey distant, but we found the people very reluctant to accompany us thither (for they feared the Chinese soldiery stationed not far from Bushia); besides the

time was far advanced for our intended tour in Cashmir. The distance from the northern foot of the Kuen-luen was one and a half day's journey. Already at Bushia the Alpine character of the central Kuen-luen had disappeared, the height in the environs of Bushia not exceeding 11,000 feet. We left Pungal on August 29th, and followed, for three marches, the valley of the Karakash river, which flows from Pungal to Suget in a westerly direction, then takes a sharp turn to the north, and then flows for the most part in an east-north-easterly direction. We met on this road with very large quarries and mines, from which is dug the Yashen stone, and which are resorted to by people living at great distances. We were enabled to procure, for future analysis, a good supply of this stone, which is very much valued throughout Central Asia.

Suget, a halting-place on the winter-road to Yarkand, is six ordinary marches distant from Karakorum; from Suget to Karakash, another town of Khotan, is six marches.

After due deliberation, we started, on the 1st of September, with Mohamed Amir and only two laden horses, leaving everything we could do without, including our little tent.

Some instruments, blankets, furs, and provisions were all our baggage.

We succeeded in making in twelve days about 220 English miles across the central parts of the Kuen-luen (25 marches of the Russian itinerary route from Yarkand to Leh). We reached Leh in the evening of the 12th of September. The country between Suget and the Karakash Pass was new to us; we had here a very good opportunity of examining the plateaus above mentioned and determining the mean elevation. We had also, before we reached the Pass, a very extensive view of the highest central peaks, which we tried to draw on the scale of 1 degree to 1 centimetre.

From this point we wished to follow the Shayuk river, as the route would have taken us through country new to us. We also met, amongst many others, a caravan with fourteen dromedaries, not unfrequently used for carrying loads on the Yarkand road; they are the produce of a singular cross between yâks and kiangs (*sic*), and inhabit heights of 16,000 to 18,000 feet. We succeeded in getting two of them (remarkably docile animals), expecting to find them particularly useful in crossing the frequent rapids in the Shayuk river, as well as the glaciers and rocks so common in these parts. But, notwithstanding the height and power of these animals, we found it impossible to go down the Shayuk valley. The river had much subsided, compared with its height when we crossed in the

beginning of August, but it was still far from passable, as it is from the end of October to the end of March.

We were obliged, therefore, to leave the road down the Shayuk valley at Sultan-Chushun, and go up the valley to Sassar, and from thence follow our old route. We had to cross the Shayuk river, not without difficulty, five times in one day before we reached Sassar. During our absence from Leh, our native doctor Shir-kishin had made meteorological observations, and—what was especially valuable to us—detailed barometric and magnetic observations; had completed a plan of Leh, 11,000 feet, the chief points of which had been laid down before our departure; and had sent collectors to different parts of Ladák to complete botanical and geographical distributions. We found all our orders had been carefully executed.

Our horses and luggage left behind at Suget, not arriving for thirteen days after us, Sept. 25th, we had time, besides finishing our plans and drawings, to make numerous casts in plaster of Paris* of individuals of different tribes, as we had already done in different parts of India and the Himálayas.

The PRESIDENT expressed the thanks of the Society to Colonel Sykes. The brothers Schlagintweit were well known to geographers and naturalists for having distinguished themselves in the survey of the Alps, and in various communications published in Germany. Baron Humboldt had always had the highest estimation of their capacity and talents. They were now employed in surveying, under the patronage of the East India Company, those distant regions into which few travellers had been. The paper contained evidence of talent, and he had no doubt there were some valuable observations with respect to the mineral springs of the country, an important point in the geographical feature of that region. It was a point to which Baron Humboldt called attention that the Kuen-luen was of volcanic origin, of which these hot-springs were the only active remains.

Mr. W. J. HAMILTON, F.R.G.S.—Although he had no knowledge of the country itself, he could not resist rising to express the satisfaction with which he had listened to the communication. He had the pleasure of knowing these distinguished German brothers previous to their departure from this country, and it was with the greatest satisfaction he had listened to the statement of the progress they were making in the investigation of the physical features of this interesting district. From the opportunity which he and many members of the Geological Society had of appreciating the talents, energy, and zeal of these travellers, he was sure they might look forward to receiving much valuable and interesting information from them. The extracts which had been read contained but a small portion of the information which they had sent home. When the whole paper was published, he had no doubt it would be found to enter into many interesting details on other points.

* We were obliged to H. Longden, Esq., superintendent of the 'Secundra Press' at Agra, for a very precious supply of plaster of Paris when our own stock was nearly exhausted.

4. *On Trinidad and the Orinoco.* By Lieut.-Col. J. SMYTH O'CONNOR,
F.R.G.S., Governor of the Gambia.

AFTER a brief sketch of the history of Trinidad, alluding to its discovery by Columbus, to its conquest by an English force under Abercrombie in 1798, and to the most distinguished of its subsequent Governors, the natural features, products, and resources of the island were described. The commanding situation of Trinidad, with reference to the navigation of the great river Orinoco, and the productive character of the countries on the banks of that stream, rendered it remarkable that no efforts had been made to establish steam-communication through that important channel between Trinidad and the interior of the South American continent. Horses, cattle, wheat, and produce of all kinds and of the finest quality, can be raised on its banks; while its navigable waters offer great facilities for disposing of English manufactures in the interior, reaching westward nearly to the capital city of Bogotá, and southwards within a short distance of the navigable Rio Negro, a branch of the Amazon.

In conclusion, the proposal of Admiral Elliot to explore the Orinoco, to ascertain the extent of its navigable waters and the means of connecting them with the navigation of the Amazon, was strongly urged by the author, as a matter of great importance to English commerce, particularly in connection with Trinidad.

The PRESIDENT thanked Colonel O'Connor for his communication respecting the advantages to be derived from a farther exploration of the Orinoco, with reference to the very fine colony which he had described in such a graphic manner. Colonel O'Connor had followed up the proposition of Admiral Elliot, and he was sure if the recommendation of the Geographical Society was communicated to her Majesty's Government, that something would accrue to the advantage of science, and he should hope to the eventual interests of the country. He had hoped also to have received a communication from Baron Humboldt, to whom he wrote about ten days ago, explaining that the Society had had one communication, and were about to have another, on the importance of opening up the navigation of the Orinoco. Perhaps the communication would come on a later day, and that he should be able to read it at a subsequent meeting. The Government had decided to make a mineral survey of the West India isles. As Superintendent of the Geological Survey of England, he had been directed by Her Majesty's Government to appoint two gentlemen to make this survey. Trinidad would be the first, and he trusted the result would show the importance and value of that colony.

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1857.

Seventh Meeting, February 9th, 1857.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS.—*Captain John Baillie, Bengal N.I., was officially introduced upon his election.*

ELECTIONS.—*Lieutenant Wm. Chimmio, R.N.; Dr. Robert Dobie, R.N.; Henry S. Keating, Esq., Q.C., M.P.; Capt. Henry Yule, Bengal Engineers; and J. M. Airey; J. B. Brasted; Dalton F. G. Dalton; John Gilchrist, and John Stuart Glennie, Esqrs., were elected Fellows.*

DONATIONS.—Among the donations to the Library and Map-Rooms since the former meeting were—‘Minutes of the Committee of Council on Education, Downing-street;’ ‘Werne’s Expedition to Discover the Sources of the White Nile,’ presented by Mr. A. S. Twyford; ‘Memoir on the Euphrates Valley Route to India,’ by Mr. W. P. Andrew, F.R.G.S.; ‘Report on the proposed Railway between the Danube and the Black Sea,’ presented by Mr. Lewis Gordon; ‘Annales de l’Observatoire Physique Central de Russie,’ presented by the Minister of Finance, St. Petersburg; ‘The Atlantic Neptune, for the use of the Royal Navy,’ presented by Mr. W. B. Webster.

EXHIBITION.—The President called the attention of the Fellows to a marble bust of his eminent friend and associate the late George Bellas Greenough, Esq., former President of the Society, executed by Mr. Burnard, as ordered by the Council.

The Papers read were :—

1. *Notes on the Route from Bushir to Shiraz.* By Lt.-General
W. MONTEITH, F.R.G.S., etc.

[As this Memoir will be published in the Journal, the following is merely a brief allusion to some parts of it.]

GENERAL MONTEITH thought the Passes between the two places to be less formidable than generally believed. He had repeatedly

traversed and examined them. No doubt there were many and serious difficulties to be met with in the shape of deficiency in quantity, and indifference in quality, of the water in many places, the difficulty in crossing the ravines, and such-like obstacles; but he thought that in neither of the two great Passes were there insurmountable obstacles to conveying an army through them. There were a number of tribes in the various districts along these Passes; but he believed upon the whole they were rather friendly inclined than otherwise. The great force of the province of Fars consisted of the ancient Persian tribes, the assembling of whom by the Government would be attended with considerable danger, as it would be uncertain which side they would take.

The PRESIDENT, in returning thanks to General Monteith for his communication, reminded the Society that General Monteith was one of their earliest Associates. He might tell them that in the year 1831, almost immediately after the establishment of the Society, General Monteith produced before them a map, which had been subsequently published, relating to the north-western districts of Persia, and particularly to the Caucasus and Armenia. As this distinguished officer accompanied Sir John Malcolm in 1810, and was nearly twenty years in the country, and as he had been an eye-witness of all that he related, he (the President) need not say that his account was to be relied on. His recent work on Erivan and Kars was well known. He had been with both the Persian and Russian armies in the campaign of 1824; and also with Prince Paskievitch in the Erivan campaign. He, the President, was happy to observe among the Fellows present so able a commentator on Persia, as Sir Henry Rawlinson,—one who was so capable of giving a lucid explanation of the geographical features of Southern Persia, and who he hoped would be induced to extend his observations also to other parts of those regions, and to diversify the subject by allusions to the great historical events of antiquity.

2. *Observations on the Geography of Southern Persia, with reference to the pending Military Operations.* By Col. Sir HENRY C. RAWLINSON, K.C.B., F.R.G.S., etc.

SIR H. RAWLINSON.—Before proceeding to offer any observations on the geography of Southern Persia, I think it proper to explain that I wish these observations to be understood as applying to a purely scientific and geographical subject. This is not the place nor the occasion, to enter into any political disquisition. I beg it to be understood, that in describing the geography of the country, in which the now pending military operations are being carried on, I offer no opinion as to the justice or the expediency of the Persian war. As a geographer, I am content to take the commencement of that war as a “fait accompli;” and I hope soon to be able to include the termination of it in the same category. The expedition, as you are aware, on leaving Bombay, proceeded first to

the Persian Gulf. This Gulf in olden times was called the Erythræan Sea. I shall not fatigue you by going into the details of the ancient history of the country; but I may just mention that this name of Erythræan Sea recalls many associations of great interest. The Red Sea of Egypt and the Persian Gulf were both called the Erythræan Sea, or Red Sea, not in allusion to the colour of the water, as has been sometimes supposed, but rather as "the sea of the Red Men;" for those Erythræans, or "Red Men," who inhabited equally the shores of Abyssinia and of the Persian Gulf, were a great Hammite race—the same which founded the kingdom of Nimrod in Babylonia, and to which belonged the Æthiopians of both Africa and Asia. These people, wherever they were found, were called "Red Men," having thus the name of *Erythræans* in the Persian and Arabian Gulfs, of Phœnicians on the shores of the Mediterranean, of Idu-means in the valley of the Euphrates, and of Homerites in the south of the Peninsula; for all these names have the same signification of "Red;" and thus the tradition is explained, that Phœnicia was colonised by the Erythræans: they are, in fact, the same people. We have indeed many proofs of this identity, which I shall be able perhaps to notice as I proceed to explain the actual geography of this famous sea. Probably the first point which will interest you, is a notice of the scenes of the recent expedition from Bombay. I have here a small plan—an amplification of a chart of Bushir and the surrounding country—for which I am indebted to Colonel Sykes. This chart shows you the country where the troops landed, and through which they marched from Hallila Bay to Bushir. The most interesting and curious matter connected with the march is this, that the very point where the British troops first came into collision with the Persians—a place which will ever be remembered as the scene of a great victory of our troops, and where so many gallant officers fell—that spot happens to be the most important in point of antiquarian and historical interest of any place in the whole Persian Gulf. At this very spot indeed existed in antiquity, the great capital of the race which ruled in the Erythræan Sea. The remains of a city are still to be seen there; and from its ruins I produce here an actual fragment, a brick from the Temple of Tirhakeh, the great king of Æthiopia, who was contemporary with Sennacherib. There are many specimens of the same class in the British Museum; and this particular brick was sent to Col. Sykes. I have written a few notes upon this place, Rishir, which probably you will allow me to read:—

"In remote antiquity it must have been a place of much importance, for numbers of bricks, impressed with cuneiform legends, have

been dug up in the immediate vicinity, belonging to the Cushite or Æthiopian race, who also held the neighbouring province of Khuzistan, and whose bricks are commonly found at Susa. Upon these bricks are found the legends of *Sutur Nakhunta*, contemporary with Sargon of Assyria, and *Kudur Nakhunta* and *Tirhakeh*, contemporary with Sennacherib. There are so many points of connexion at this period between the Æthiopians of Africa and the Æthiopians of Asia, that is, between Meroe and Susa (such as the identity of the traditions referring to the two countries, the double Memnon, double Cepheus, &c.), that I think it by no means impossible the Tirhakeh of the Erythraean Sea, whose bricks are found at Rishir and Susa, may be the very king of that name, who is mentioned in the Bible and in the cuneiform annals of Sennacherib, as having invaded Syria from Egypt, and having fought with Sennacherib, while that monarch was engaged in his famous campaign against Hezekiah of Judæa. At any rate, the kings had the same names; they belong to the same period of history, and ruled over divisions of the same race. And if the geographical distance of Meroe from Susa and Rishir be thought to be fatal to the identification of the two Tirhakehs, I would quote the nearly parallel case of the Imaum of Muscat, who at the present day holds Kishm in the Persian Gulf, and Zanzibar on the coast of Africa.

“Under the Achæmenians we are unable to ascertain the name of Rishir. The metropolitan city of this period, in the vicinity, was Taoke, or Dalakee, where there was a royal palace of the Persian kings, mentioned by Strabo, Arrian, and Ptolemy; and the port of this city was at the mouth of the Granis, either at Bunder-Rig, or at what is now called Rohilla Point, extensive ruins being found at both of these spots at the present day. (*Yacut* notices these ruins south of Genava, and applies to them the name of Shiniz, which, however, generally denotes a place at the mouth of the Tab.)

“Under the Sassanians, in about A.D. 230, Ardeshir Babegan rebuilt the two cities of Taoke, or Toug, and Rishir, and called the one ‘Ram Ardeshir’ and the other ‘Riv Ardeshir’—that is, ‘the rest of Ardeshir,’ and ‘the delight of Ardeshir.’ Riv Ardeshir became corrupted into Rishir, which has applied to the ruins of the city ever since.

“During the third and fourth centuries, Riv Ardeshir was the seat of the Christian metropolitan of Persia; and Johannes of Rishir, who sat at the Nicene Council in 325, is said to have had ecclesiastical jurisdiction over all the churches both of Persia and of India.

“At the time of the Prophet, Shahrek, the Marzaban or ‘Lord of

the Marches,' a Magian chief, held all this part of the country; and the Arab historians describe his conquest by El Hakam el Thakafi, who was sent by Omar from Bahrein, to reduce the sea coast of Persia. The two battles, by which Shahrek lost Toug and Rishir, are described in detail; and the latter engagement is said to have been not less bloody than the famous field of Kadissieh."

Now, that is the history of Rishir in antiquity—of a ruin which has passed almost unnoticed up to the present day, and has only been called into prominence by the recent operations. I have given you a brief, though continued history of it from the time of Tirhakeh, the great Æthiopian King, down to the Mahommedan conquest. After that period, the place fell into ruin, and it is rarely mentioned by geographers, until about the year 1500. In 1520, I believe, it was repaired and rebuilt by the Portuguese. The fort which the enemy occupied on the recent occasion, and which is called the Portuguese fort by us, is, I believe, one of the very old works. It is called in the country, generally, "the Fort of Nebuchadnezzar," and it is always noticed in the Persian gazettes as the "Fort of Bahmen," who was a King of the old Dynasty.* The Portuguese restored this fort, but the name they gave to it, I have never been able to discover; it was probably, however, a real Portuguese name; at the present day it has recovered its old name of *Rishir* (or *Riv Ardeshir*), and perhaps dates from the time of Tirhakeh, the Æthiopian King.

I must now return to the more important subject of the actual geography of the gulf. From the earliest times, the Persian Gulf has been of much consequence, owing to its position upon the great line of communication between the east and west; that is between India and Europe. There have thus been in the Persian Gulf, a succession of *emporium*, places where the commerce of the gulf was concentrated, and which varied in situation according to circumstances. The earliest port, as far as I have been able to discover, was situated at the mouth of the Euphrates. That was probably anterior to the Persian Empire, before, I mean, the Empire of Cyrus the Great. When the empire of Cyrus was instituted, and Persepolis became a great capital, then the city at the mouth of the river

* By the name of Bahmen the Persians indicate *Bahmen Ardeshir*, or Artaxerxes Longimanus; but it is probable that in adopting this nomenclature they have confounded the two Ardeshirs, referring the tradition of *Ardeshir Babegan*, who really rebuilt *Rishir* in about A.D. 240, and named it *Riv-Ardeshir*, to the more ancient Bahmen Ardeshir or Artaxerxes Longimanus, who lived in the fifth century B.C. An instance of the very same confusion occurs in the vicinity of Mohamrah, where the city known to the Greeks as *Χαράξ Σαραβίς*, and rebuilt by *Ardeshir Babegan*, who gave it the name of Asterabad, or *Kerkh-i-Misân*, received after the Arab conquest, the title of *Bahmen Ardeshir*, now corrupted to *Bahmishir*.

Granis soon rose into importance, as the port from which all the supplies of merchandise came into the country.* At the time of Alexander's eastern campaign, we find mention made of Mesambria, which is probably Bushir, and of the river Rhogonis, which is the same as the Genava.† There were emporia probably at both of these spots. In later times, the time of the Mahomedan conquest, the great place was Siráf. This place, Siráf, continued to be the emporium of the Gulf for a long period,—indeed, probably four or five hundred years,—but the site has been improperly laid down in the maps.‡ Then, the emporium was moved to the island of *Keis* or *Kenn*. After *Keis* was ruined, the great emporium was at Ormuz on the main land; and when that was destroyed, it was removed to the island of Ormuz. This place, the island Ormuz, was taken possession of by the Portuguese in 1519, and for above 100 years it was the entrepôt of all the commerce between the east and west.§ In 1625, the East India Company sent three officers, Captains Bligh, Weddell, and Monoxe, with a considerable fleet to assist Shah Abbas in driving out the Portuguese. It was during this expedition that the famous navigator Baffin, the discoverer of Baffin Bay, was killed at the bombardment or siege of a place on the neighbouring island, the town of Kishm, from which the island

* The name of the city at the mouth of the Granis is not given by Arrian; but *Taóxn* is mentioned some way up the stream, as the site of one of the royal palaces; and both Strabo and Ptolemy confirm this statement. Now Taoke is of course the *Toug* or *Touj* (ترج or ترگ) of the Arabic geographers, immediately at the foot of the mountains on the road from Shiraz to Genava; thus exactly answering to the position of the modern *Dálaki*, and leading to the inevitable inference, that the mound on which the present fort is built, covers the ruins of the old Achæmenian palace. The *Dálaki* river, or Granis, formed of two arms, which unite before it leaves the mountains, again bifurcates as it approaches the sea, one arm falling in at *Rohilla Point*, and the other at *Bunder-Rig*. There are extensive ruins at both of these places, probably of the Æthiopian period; but it is at *Bunder-Rig*, I think, that we must look for the *Shimiz* of *Yacut*, a very ancient site south of *Genava*.

† *Aru-guna* (i. e. *Págyavis*) in Hamite Chaldee, and *Gunáva* in old Persian, signify the same thing, “the river of *Guna*.” The Arab geographers usually write the name *جنابه* *Jenâbeh*; but the old pronunciation of *Gonava* is now alone known in the country. It is just opposite to the island of *Kharg*, or *Karrack*.

‡ The error of placing Siráf to the south, near Cape Seres, originated with Sir W. Ouseley, who confounded the name with that of *Shinás*. The real Siráf is now called *Shilau* (an older form of the same name, probably meaning “a torrent” or “full stream”) and is close to *Taurie* (properly *Táhiri*, from its founder *Táhir*), and not many miles from Congoon. Morier describes the antiquities of the place, and its cuneiform bricks, on the authority of a naval officer who had visited the ruins. It should be well examined during the present expedition.

§ The *’Ogusoria* of Arrian is Ormuz, on the mainland. The island he calls *’Ogáva*, which is probably the same as *Gerún*, altered by the Arabs to *Jerún* (جرون).

has its modern name.* The Portuguese after a short siege were obliged to capitulate, and Ormuz was taken possession of by the united British and Persian force. In consequence of this exploit, Shah Abbas gave privileges to the British government which we retain to the present day; in fact, it is owing to the assistance rendered by us in the taking of Ormuz, that we have the right of possessing a residency at Bushir. Shah Abbas, in the first instance, permitted us to have a factory at Gombrun, or Bunder Abbas, opposite Ormuz; and this remained until about 100 years ago, when the establishment was transferred from Gombrun to Bushir, and early in the present century, the Factory was exchanged for a Residency. It is quite impossible to give now a detailed description of every place along the coast from Ormuz up to Bushir. All I can do is to explain generally that the sea-board of the Persian Gulf consists of a belt of low land, with mountains at a short distance from the coast, varying from ten to thirty miles, seldom more than thirty, and seldom less than ten. At Bushir, the distance is about twenty-five miles. This low land between the mountains and the sea is arid, badly-watered, containing no trees, except date-trees, and inhabited by Arabs. It is altogether a very unpromising country. The hills ascend abruptly at about thirty miles inland, and are intersected by numerous valleys watered by mountain streams. These valleys are beautiful spots, filled with lovely gardens, and inhabited by fine mountain tribes, who are probably the best class of men among the whole Persian nation, whether considered in regard to bravery, honour, or fidelity. At the northern extremity of the Persian Gulf, the mountains recede more to the northward, leaving a large tract of country which is entirely plain, and which was formed originally by the alluvial deposit of the large rivers that here descend from the mountains. This tract of country is extraordinarily rich, and quite different in character from the belt of low land in the neighbourhood of Bushir. It is an alluvial soil, admirably adapted to cultivation, while the other tract is a mere barren, sandy desert. If it should be necessary—which of course we all

* Arrian names this island, which was said to contain the tomb of the Eponymous hero, King Erythras, *Οἰζακτα*; and the title remains to the present day, under the scarcely altered form of *Vroct*. The name is, I suspect, Hamite Chaldee, signifying "the separated," or "broken off," in allusion to the natural convulsion which divided the island from the main in remote antiquity, and the tradition of which has been preserved by Justin (from Trogus Pompeius) in his description of the migration of the Erythræans from the Persian Gulf to colonize Phœnicia. The Arabs named the island *Laft*, from a town of that name which still exists at the back of the island, and *Ibn Gáwan*, *بن غاون*, from the tribe which settled there.

hope it will not be—to continue operations in the Persian Gulf, it is only natural to suppose that we shall turn our attention to the particular part of the country I am now noticing; and I may as well, therefore, explain to you something of its geography, commencing with the mouths of the river Euphrates and the surrounding delta. You are aware no doubt that, according to the intelligence we have in the public papers, there is another division about leaving India at the present time, and I am thus betraying no confidence in alluding to the probability that this division may be directed to disembark at Mohamrah, which is the only other Persian port of any consequence on the gulf. If I may judge from the admission of an influential journal, of its ignorance of the position of Herat, the English public would seem to be not very well up in geography, notwithstanding the efforts of this Society to spread a knowledge of that interesting science. It can hardly be questioned, however, that we are improving. A few years ago we had very little acquaintance with Balaklava, or Kertch, or any of the Ports, either in the Sea of Azof or on the coasts of the Black Sea. Now, they are all household words. In the same way we know very little at present about Bushir, or the place to which I am about to introduce you, Mohamrah, but it is very possible that before long they will also become household words with us. I must commence then by explaining that Mohamrah is Persian soil. Upon this map, the frontier between Persia and Turkey is not laid down at all; and in most of the maps where the frontier is laid down, it is done incorrectly. The real line of frontier between the empires, not only as it exists at present, but as it is confirmed by the treaty concluded at Erzeroom under the sanction of England and Russia, comes down to Mohamrah, and then follows the course of the river Euphrates to the sea, so that this island named *Abadán** is Persian. I should here perhaps repeat the statement which I made to this Society on a previous occasion, much to the surprise of the President, that all this country is quite new, within comparatively recent times. We can indeed historically trace its formation mile by mile. The great city of which the ruins are to be seen above Mohamrah was an island

* The island of *Abadán*, lying between the *Bahmishir* (properly *Bahmen Ardeshtir*) and the *Shat-el-Arab*, or the two streams which form the delta of the Euphrates, answers to the Southern Mesene of the Greeks, and the *Misán* of the Arabs and Talmudists. The name in the inscriptions of Sennacherib, which has been read *Khupapan*, ought, I think, to be pronounced *Hubadan*, the same as the *'Abadan* عبادان of the Arabs, and Ἀφφάδων of the Greeks. The early Persians named the island *Miyan Rudan*, "between the rivers," evidently after the Greek *Mesónus*, from which term also the Oriental *Misán* was probably derived; for the title is unknown in the ancient inscriptions, and has no meaning in the Semitic tongues.

in the time of Sennacherib, named *Billat*.^{*} It was an island even up to the time of Alexander, being mentioned in the history of that period under the names of Aphle and Apollogos. As Obollah on the sea coast, it became the great entrepôt, under the Sassanians and the early Arabs, of the commerce running up the Euphrates. Now, it is sixty miles from the embouchure of the river, and we can trace a succession of cities below it, along the river, down to the sea. It would seem indeed, that every two or three hundred years, a new city was founded on the sea shore, that it was then left dry, and the people were obliged to desert it and form another port lower down. In continuation of this subject, I may mention that along the whole of the sea coast, from the mouth of the Euphrates to the mouth of the Tab, there is a series of extensive sandbanks, which will all become dry land in the course of a few years. The reason of this change is again quite evident. It is not merely the simple physical process that we observe in other countries, namely, that the river water coming down charged with alluvium, and meeting the tide, deposits the matter that it holds in solution; but there is in the Persian Gulf an additional cause of deposit. There are indeed but two winds, either the north-west blowing down the valley of the Euphrates, or a strong south-easter blowing up in the face of it. When the wind blows down, there is of course no deposit; but when it blows up, which it often does for days together and with great violence, it then brings the whole force of the sea directly against the current of the Euphrates, and an enormous deposit naturally takes place. That deposit is going on yearly; and, undoubtedly, in a few hundred years, the mouth of the river will have extended out very much farther than at present. According to my calculation, the increase is about a mile in thirty-five, or in less than forty years. It is very doubtful if, what is now called the mouth of the Euphrates, be the true mouth of the river. The true mouth of the Euphrates, I myself believe to be, what is now called, the *Bahmishir*, and that which is at present, the mouth of the

* The ruins of Obollah, which was a place of great importance at the time of the Arab conquest, and which may very well be supposed to represent not only the *Billat* (the *t* is the mere feminine termination, and was probably dropped in pronunciation) of the cuneiform inscriptions, but the Aphle and Apollogos also of the Greeks, are to be seen on the right bank of the Euphrates, about two miles above the mouth of what our sailors call the Haffar or Mohamrah Creek. The name, however, of Obollah is now lost. The site is of much interest to Indians, as the place whence the Chaldeo-Persian colony emigrated on the approach of the Arabs under *Khaled*, and sailed for India, carrying with them books, like the *Bundehesh*, written in a language that we call *Pehlevi*, but which is in reality the vernacular dialect of Southern Chaldæa in the seventh century. The colony landed at *Sindan*, in Guzerat, now called St. John; and the Parsees of Western India are their direct descendants.

Karún. You have lately heard from Mr. Loftus, some interesting disquisitions upon that river. I have only to observe, in reference to it, that, if we were to occupy Mohamrah, and if there was any occasion to press farther upon Persia, then the natural course would be, to ascend the Karún into the open country of Susiana, instead of attempting to mount the impracticable passes between Bushir and Shiraz, which have been described in General Monteith's paper, and which I venture to say, are not to be forced by any army in front of an enemy. With respect to the physical geography of these passes, I consider General Monteith's description to be very accurate. When I saw them first, and still more when I first ascended them, I thought they were quite impracticable to any army; but after having been a good deal about Persia, and having taken guns up passes still more difficult, both there and in Affghanistan, I was satisfied as to the possibility of conveying artillery anywhere—provided there is no opposition. By putting a regiment to a gun, you may drag it anywhere by sheer force—up the Himálaya or the Andes;—and you may thus, of course, take it up these Persian passes; but the operation is not to be attempted in front of an enemy. I observe that Mr. Rich, a very good geographer, has the same idea that I have, as to the passes on the route to Shiraz. He says the roads in Persia are bad, but not nearly so bad as in Kurdistan; that the passes between Bushir and Shiraz are bad, but the passes between Senna and Sulimanieh are much worse. There is no occasion, however, I conceive, to attempt to force these passes. Another mode of attack would be far less difficult and equally, if not more, effective. The whole country to the north of the Gulf is perfectly open. The river Karún from Mohamrah is navigable almost up to Shuster; one of our steamers, indeed, has already made the ascent. Of course, at that time the steamer went up for the mere prosecution of geographic science, and without the slightest expectation that the knowledge obtained would ever be turned to political account; but I see that we do not get credit for disinterestedness; on the contrary, in a paper which was published in the last number of the "*Revue des Deux Mondes*," there are statements from which it would really appear, that the continental nations are disposed to think, that all our previous explorations, and travels, and wanderings in Persia, have been undertaken for the express purpose of preparing for this present war. I find it stated, indeed, that a friend of mine, whom I am glad to see present (Mr. Layard), and who at that time was travelling about the Persian Mountains for the purpose of copying inscriptions and acquiring geographical knowledge—I find it stated that his travels were carried on at the expense of Govern-

ment, and for the express purpose of maturing the plans which are now being carried out. He is not mentioned by name, but is described in a manner which leaves no doubt of his identity. Now it so happened that while this gentleman was exploring the Bakhtiyari mountains, a steamer was going up the Karún at the same time, for the purpose of executing a survey of the river, and accordingly these two facts are put together in the paper alluded to, and it is inferred that this country must have been laying those plans fifteen years ago, of which we have the consummation in the present Persian war. Such is the consolation we get for our geographical ardour, and our desire to communicate our knowledge to the world.

To return, however, more particularly to the Karún :—the passage of our steamer up the river was no doubt of great use in showing us the navigability of the stream ; but if it ever should be necessary to pass up the river into the interior, it is not to be supposed that one steamer, or two steamers, or half-a-dozen steamers will be sufficient to meet the requirements of the expedition—the invading army must, of course, march along the banks of the river, merely trusting to the flotilla for the conveyance of its stores and ammunition, and in ten days' march from Mohamrah it would reach the town of Shuster, which is situated in one of the best supplied districts in the whole of Asia. The town of Shuster moreover is extraordinarily strong in a military point of view, being defended on two sides by a great river, and with a wall and ditch at the base of the triangle leading from one river to the other. It is altogether one of the strongest military positions that I remember to have seen anywhere. The whole tract of country between the two rivers, is farther admirably irrigated, and is in fact one vast expanse of garden and cultivation. The only drawback that would be met with is the heat. In summer time the place is almost as hot as Bushir itself, although by no means so unhealthy, since at Bushir, it is not so much the heat as the humidity which creates unhealthiness, while at Shuster the climate is singularly dry. Should a British army, however, be encamped at Shuster, it must be understood that they will merely have the command of the country below the mountains. That alone is an important position. It would certainly be of great political importance to hold a province of this extent and richness at our command ; still we must be careful not to run away with the idea that, because an army has advanced to Shuster, it is in a more favourable position for operating on Tehrán, than it was in at Bushir. It is in fact, all but impossible to penetrate into the interior of the country from Shuster, that is—

for an army to advance with all its supplies and materials of war. I have on different occasions traversed most of the passes which lead from the low country to the interior of Persia, and the only road which is practicable for guns, without extreme difficulty, is the pass on the high road from Bagdad to Kermanshah, and even that pass is far from easy. It was anciently named "The gates of Zagros," and is now called the pass of *Tak-i-Gerrah*, from an old Roman arched toll-house on the ascent of the mountain.* In the south there is a pass leading from Siráf to Shiráz, but Captain Lynch is I think the only English gentleman who has ascended it, and I am not aware that any account of it has been published. The two passes described in General Monteith's paper are both execrable, and the southern pass by Firozabad also suffers from want of water. Then, again, in the country of Susiana there are footpaths leading up the mountains in many directions along which several English travellers have passed, such as Mr. Layard, Mr. Loftus, and myself, but these are mere paths; they are not roads practicable to artillery; the only military route by which the mountains can be ascended from Susiana is along the valley of the Kerkha, but in that case the circuit is enormous. You have to follow the river almost as high up as Kermanshah, in order to get through the mountains and come out upon the plateau of Iran. I have myself taken guns by this route from Shuster on to the plateau at Kermanshah, but of course unopposed; and I do not think I could have ascended the passes in the face of an enemy. Having thus given a general description of the passes, of the rivers, and of the sea-coast, the only subject which remains to be noticed by me, in reference to this part of Asia, would seem to be the inhabitants. I mentioned before that the coast-line—the belt of low land that is along the coast—is exclusively inhabited by Arabs. Beyond them, towards the interior, you have warlike Persian tribes inhabiting the mountains. Immediately above Bushir, the Mame-

* *Tak-i-Gerrah* means "the arch holding the road." The present building probably dates from the time of Gotarzes or Vologeses, when the Parthian kings were supported, and even nominated from Rome, and is certainly of Western architecture. In earlier times the body of Molon, the rebel satrap of Media, was here erected on a cross by Antiochus.

The name of Zagros has long been a puzzle in geographical etymology. Remembering, however, that the inner face of the mountains is throughout the range named *Pasht-i-koh*, or "back of the hill," and that *Za-giri* has this exact signification in Skipetari, I cannot help suggesting such an explanation; and if it is asked what the Skipetari could have been doing in the Median mountains, I would point to the neighbouring city of *Hohcan*, which is actually called Albania in the Peutingerian map, and has a nearly similar name in the Cuneiform Inscriptions; and I would further note the general use of the Arian term *Giri* for "mountain," throughout this part of Asia.

senni are the principal people, and they have hitherto been particular friends of the British. *Bákír Khan*, son of *Walee Khan*, the old chief of *Kíleh Sufíd*, has often been the guest of the Resident at Bushir. He is, I believe, at present the head chief of the Mame-senni, and in that capacity king of all the mountains, and accustomed to look to the English for assistance and protection against the Persian government. I once passed a day with *Bákír Khan* among the ruins of Shapúr, and was greatly pleased with him; he was indeed a general favourite with all Europeans who ever met him. He had been moreover in former days imprisoned by the Persian government, and consequently bore no good will towards them. Almost all these tribes, Persian as well as Arab, that is, the Mame-senni, the Dashti, the Tangistuni, are governed by chiefs who have been in habits of friendly commerce with us, and whom we know and esteem exceedingly; and I can never persuade myself to bring such men into the same category of national hostility with the officers of the Persian government; they have, in fact, no sort of feeling in common with the court of Tehrán. They are brave, honourable, independent men; and I do hope they will not be driven by the force of circumstances to become our blood enemies, like the chiefs of Affghanistan.* Above the mountains these warlike chiefs are to be met with in all directions; the chiefs of the Bakhtiyari, for instance, who are rough, wild fellows, but still much superior to the courtiers, artisans, and peasants whom you meet in the towns and villages. Some of them are very like the old Highland lairds, being able to bring into the field as many as four or five thousand men. Taken as a class they are, I should say, most estimable people. In the plains of Susiana the permanent inhabitants are Arabs; but the Lúrs come down also in the winter from the mountains to feed their flocks in the rich pastures of the Kerkha and Karún. The tribes to the north of Susiana, are wilder than the tribes to the south, and even more addicted to brigandage; but even they have their good qualities. I have not ventured to enter upon any details of physical geography, because, although there is a good deal to be said on that subject, the question of immediate interest refers rather to political geography. I may notice, however, before

* One instance of this change has already occurred which is greatly to be regretted, and which is ominous of future trouble. *Bákír Khan*, the old chief of the *Tangistunies*, was always on terms of intimacy with the British resident, and not unfrequently did good service to the British Government. His son, Ahmed Khan, however, on the occasion of the present invasion was driven into the ranks of our enemies, and fell at the head of his Tangistunies, when we stormed the old fort of Rishir. We are now, therefore, blood-enemies with this powerful tribe, for all time to come.

sitting down, that all the rivers running through the country of Susiana have at one time or other changed their courses. It was suggested, I think, by Mr. Loftus, on a previous occasion, that some of these rivers seemed to have formerly run in different beds; but I would go much farther, and undertake to prove historically that one and all the rivers have changed their courses, and that these physical changes have given rise to much political confusion. For instance, the original course of the river Karún was through *Guban* to the sea, and it was mainly owing to a great dam being erected at *Sabla* to raise the water of the river for the purpose of irrigation, that it came across and joined the *Bahmishir*. I am now speaking of later times; but Alexander is said, in antiquity, to have dug a canal from the *Pasitigris* to the *Euphrates*, along the line which has again recently become the river bed. The course of the *Karún* through *Guban*, was the original frontier between Persia and Turkey; but the river, having changed its course, is still regarded as the frontier, and the Persians, in consequence, have got a large accession of territory, to which they have no political right. If you refer indeed to the old maps, you will see that Persia has no right either to the *Guban* territory or to the *Island of Abadán*. I do not remember that I have anything further to state on the geography of this part of the country. I see many gentlemen present who have travelled over the same regions, and who possess, no doubt, much information on the subject. I shall be happy both to listen to them, and, if required, to answer any questions.

GENERAL MONTEITH, F.R.G.S.—I am not by any means so well informed on the subject as Sir Henry Rawlinson, but I was directed by Sir John Malcolm, in the first instance, to proceed to *Shuster*, to trace the river *Karún*, and particularly to visit the ruins of *Susa*. We marched by land along the shores of the Persian Gulf to *Bassorah* by *Rohilla*, *Rig Gunnowa*, *Hissar*, *Delim*, *Shebulsha*, *Endecan Mashúr*, and *Darak*, the capital of the *Chab Sheik's* territories; from thence traced the *Karún* to *Shuster*, and visited *Desful* and the ruins of *Susa*. Another object was to see by what routes the French, who were then expected to make the attempt, might advance on India. The principal route is that which Alexander is supposed to have followed. It leads from *Shuster*, through the valley of *Hormuz*, to *Persepolis*. There is a desert destitute of water for about eighty miles from the *Karún* to *Ram-Hormuz*. The people of the country have a tradition that a settlement from this place established themselves on the island of *Ormuz*, at the mouth of the Persian Gulf, which afterwards became so renowned for its wealth and commerce. I cannot say much for the road up the valley of *Hormuz*, leading through rice swamps, but the valley is beautifully cultivated. The passes there would be practicable for artillery with very little trouble, being only separated from the plain of *Babahoon* by a low range of hills. The celebrated pass, which was forced by Alexander, can be distinctly recognised about 10 or 12 miles from the *Kalai-sefid*. That *Kalai-sefid* I ascended, and remained there for two or three days. It is the most singular place I ever saw, and rises 1500 feet above the level, and abounds in springs all round it. An artificial

path has been cut, but it is so easily defended, that a small body of men could easily repel a large force. It was, however, taken by the Persians about twenty years ago. That was the last attempt made by the Persians to bring the tribes into some sort of order, for they are the greatest thieves in the world, plundering caravans, and everybody they possibly can. We were not robbed by them, owing to our strong escort of Persian troops. From this point there is a pass which would require to be repaired, and which would be forced without any great difficulty. Between this pass and Shiraz there is no great obstacle to be encountered. On returning from Bushir to Tehrán in 1820, I spent a month in examining the passes leading from Bushir to Shiraz, and thought them less formidable than they appeared to be. I had a good number of men with me, and I sent them up to the right and left to see whether these rocks, apparently inaccessible, could be gained, and I saw them in a short time crowning both sides of the pass. I took up twelve pieces of artillery; but with 500 men, and it took us three weeks to get them up. The plan I adopted, was to dismount the guns entirely and put them upon cradles made with trees. Twenty-four men to each gun, could only convey it a short distance; then they were relieved by others, and by that means we forced a way up the pass: of course that could not be done, if opposed, until you had crowned the heights. After passing the worst part of the first pass you could, by throwing a bridge across the ravine, reach a tract of country of much less difficulty. After passing through Konar-Tukht there is another pass, which descends towards Kazerún: here there is nothing but stones, which could be blasted or removed. From Kazerún you have a very strong pass, the Virgin's pass, which is carried almost up the perpendicular face of a steep hill; and the dilapidated condition of the parapet scarcely prevents cattle tumbling over. I followed the salt marsh down for about a mile, and saw a gap in the mountains which would require a bridge over the marsh. From that you get to the last pass, the Old Woman's pass, which is very steep but not very rocky, and a road could be made without any impediment. After that there is no further obstacle to Shiraz. I have only one thing to say as regards Chab, the country to the right of the Karún. In my day it was governed by a chief who was nominally subject to Persia. His predecessor cut a canal for the purpose not only of irrigation, but of turning the navigation, and bringing the commerce of that part of the country into his own territory. Some creek or channel must have been navigable, for I saw within the walls of the city some of the largest vessels, although there was not more than three inches of water at the time, but it could be augmented by returning the water of the irrigation canals into its natural bed. The vessels were about 300 or 400 tons burden.

MR. A. H. LAYARD, M.P., F.R.G.S.—Mr. President, as you have done me the honour to call upon me, I may perhaps say a few words, more to verify what Sir Henry Rawlinson has stated, than to advance anything new on the subject. I quite agree with him, that if this war is unhappily to be continued, the site of our operations, at least of the position which our army must hold, must be transferred from Bushir to the upper country, on the banks of the Karún, in the neighbourhood of Shuster. It is a very rich, fertile province, perhaps the richest of the whole of Persia. I am pretty well acquainted with the whole of that country, having resided there nearly two years; and as Sir Henry Rawlinson stated, I was not there with any evil designs. Indeed, I had not the remotest idea at that period that we should ever be engaged in warfare with Persia. The origin of my entering that country is principally attributable to the Memoir of my friend upon the site of the ancient city of Susa. Perhaps the best account I can give of it is to state shortly how I got there, which was not very easy at that time. My first intention was to penetrate through the centre of Asia; but at that period wars had broken out, and the roads were

completely stopped. Instead of remaining idle at Ispahán I resolved to penetrate into the Bakhtiyari mountains. I had spoken to Mahomet Shah on the subject. At the time I had been taken prisoner by Mahomet Shah, for we had broken off our relations with Persia. I asked for permission to go into the Bakhtiyari mountains. The Vizier said that it would not be safe, as the tribes were hardly under Persian rule; that if I went I should be killed. I pressed for permission, however, and he drew up a paper, which I had to sign, and in which it was stated, that if I had my throat cut, it would be my own fault. I started off from Ispahán, and made acquaintance with the chief of the Bakhtiyari tribe. I made his acquaintance in a curious way. General Monteith says the people are robbers: they are certainly very quick in taking possession of people's property. There was a Frenchman at Ispahán making drawings of pieces of sculpture. I had seen a capital, and I told him to go and draw it. He went on horseback to the spot, and, having dismounted, took his sketch with the bridle of the horse over his arm. He was so much occupied with his work that some person came behind him, slipped the bridle off, and took away the horse. When the Frenchman had finished he found his horse gone. We made inquiries and found that it had been taken by a Lúr. This led to my making acquaintance with the Bakhtiyari chief. He said he was going to return to his country; and finally, at his invitation, I returned with him. We crossed a high mountain by a difficult pass, and came to the castle of the great chief. He was a most enlightened man; and in the course of a few years, by his talent, determination, and courage, had subdued the whole of these mountains, and could bring some 23,000 men into the field. By mere chance, knowing a little of medicine, I cured his little boy of a fever; and I remained with the chief a long time. I found him so intelligent that I proposed many things to him; among others, that he should open the rivers, establish schools, and introduce commerce. When I left him and came down the Karún, sounding all the way with a string, as far as Karak, which was then occupied by British troops, I told Captain Henneh, who was then political resident, what the chief wished, with the view to establish commercial relations with that country; and, at the same time, I wrote to the Chamber of Commerce at Bombay on the subject. I went back to the Mountains, and while there, I am sorry to say, the Persians marched upon the tribes.

There has been a question about the practicability of these mountain passes for guns. It is true they are very difficult roads, and, strictly speaking, not practicable to artillery. They are only practicable in the way described by General Monteith. When I was at Susa, the Persians marched from Ispahán and crossed the mountains, bringing with them several guns and a large body of infantry. They were not opposed. I may mention, that all the tribes there live in tents; their life is very interesting and very pleasant. When the warm weather comes, they live on the highest tops of the mountains, among the glaciers and snow; and, as the weather becomes colder, they gradually descend the sides of the mountains, and get into the valleys in the winter. Thus they almost always enjoy perpetual spring, and always verdure for their cattle.

The road from Mohamrah to Susa is perfectly practicable for artillery, supposing the country were held. The road is not difficult, and the mountains are easily crossed; therefore, as far as Susa is concerned, there is no difficulty whatever. The only difficulty is to cross the range of the Zardeh Kuh; whereas, from Bushir to Shiraz, the whole country is one mass of mountains and difficult passes. In the part of the country to which I have directed your attention, there are only one or two passes, which are no doubt difficult, but they are practicable for guns, because the Persians carried theirs over. The Persians came down to Susa, and there they began intriguing among the tribes. Unfortunately, in Persia and Turkey the governing

authorities always have four or five chiefs, whom they play against the others. When one man is in the ascendant, they set four or five others against him. This is the way in which weak governments succeed in ruling over powerful tribes. There is no tribe in Persia equal in courage to the Bakhtiyari. When the Persians came to Susa they encamped. The tribes at first thought of attacking them, but the project was given up. The Bakhtiyari chief quitted his mountains, taking refuge amongst the Cháb Arabs, and came down to Fellahiyah. There a curious phenomenon took place. The Arabs destroyed the banks of the river about thirty miles above Fellahiyah, and by that means threw the water over the whole country, and made it an enormous lake. I then came down in a boat from Shuster to Ahwaz, with a party of what they call in Persia, Looties—dervishes and fellows who wander about, tear the skins of beasts, and play upon fiddles. When I got to Ahwaz, I found all my travelling companions were going to a holy place on the Euphrates, called Kerbula. At Ahwaz they began to make up their accounts, to see what money they had; when, finding that they had not a penny between them, they all began crying. I had a little money with me, about 5*l.*, which was all I had possessed for two years. However, when I searched my purse, I found all my money gone, and I was in the same condition as my friends; I had not a single half-penny; I had only a saddle with me. A Persian, seeing my difficulties, offered me five shillings for it, and I was obliged to accept it, and with that five shillings I hired a man and a mule to carry me across the country. When we reached the Fellahiyah river, we found that the Arabs had broken the banks and flooded the country. We got to a village towards the evening, and I found all the people preparing to go away. The mode they adopted was this:—In that country they have cottages made of reeds, and exceedingly pretty many of them are. They pull down these reeds, bind them together, make rafts of them, and float down the river to a place of security. In the night, my man, with his mule, ran away, and left me to my fate. In the morning, I found the villagers binding up the reeds and making rafts. I asked them to make room for me, but they refused; and they all went away, leaving me perfectly alone, surrounded by dogs and jackals, and other animals. I sat there some time driving off these beasts. At last I thought it better to do something for myself, bound some reeds, and made a raft, and in the morning floated down the river. It was very curious, like a scene in the ‘Arabian Nights.’ I floated down all the day, passing many of the rafts, and in the evening I came to a part where the river branched off into several canals. I went down one of these canals by chance, and presently I floated into the middle of a palace, in which there were a number of persons sitting round and smoking their pipes. The chief of the Cháb Arabs had built the house, and had carried a canal through it. I floated into the palace, and remained for some time with the chief, whose artillery I had the honour of commanding during the siege we sustained. At last, however, the Persian commander sent his relation, a Christian, with a Bible, and a great chief of the Mohamedan race with a Koran, and with this double shot promised the Bakhtiyari chief, if he would take the oath of allegiance, to send him back in safety to the mountains. The chief, not made wiser by the fate of his predecessors, went to the Persian commander, reassured by the presence of the Bible and the Koran, and was taken prisoner. I went with him, and was also taken prisoner; but I got away, and after that we had a long series of fights; and at last I lost all my friends. After wintering in the country four or five months, I at length quitted it. This sojourn there has given me rather a strategical knowledge of the country.

It is impossible to describe the beauty of the plains of Shuster, which form a perfect paradise at certain times of the year. At the end of February the rains cease, and, in a single day, the whole country is covered with a carpet

of grass. The change is marvellous. You go to bed with the country quite yellow, and awake in the morning to find it perfectly green. The grass increases until May, and gets so high that horses can scarcely make their way through it. After May, the heat soon dries up the grass; it disappears as rapidly as it grew, and the whole country becomes again a parched and barren desert. The heat in summer is so intense, that it is almost impossible to live there; and I doubt whether any European troops could exist there in tents. The inhabitants are obliged, the whole of the day, to live in holes under ground, whence at night they issue and sleep on the tops of their houses. For three or four months in the summer it would be impossible to live in tents; but at a short distance from Shuster there are what they call the "yilaks," or summer quarters. You have only to ascend a little, and you get into rich mountain plains, where the climate is delicious, and where you may pass the summer months in security, and get an abundant supply of cattle, sheep, and other provisions. The plains below Shuster produce almost everything; in fact, it is one of the most productive countries in the whole world. I hope that, whatever may be the evils produced by the war, some good will result from it, and that the country will be opened up to the enterprise of the British merchant. The inhabitants are not bad people. During the time I was in these mountains I used to go about, from one end of the country to the other, without an attendant. On one occasion only I was plundered; and even then the chief got everything back for me. It was a common saying at that time, that a man might walk from Shiraz to Kermanshah with his hands full of gold, without being touched. The people in the plains are exceedingly quiet: they are our friends, and have always been most desirous to enter into friendly relations with us. I can give you a curious instance of this. I went up to Shuster on one occasion in a steamer under Captain Selby. At that time the river was very high. As the current was exceedingly strong, we did very well so long as we kept in the centre of the river; but Captain Selby was desirous of keeping as near as possible to the sides, where the water was still or dead. We had been aground many times through the day, and at sunset we again got aground. The men had been working very hard all day, and the Captain allowed them to go to bed, thinking he would get the steamer afloat in the morning. In the morning, however, we found ourselves in the middle of a corn-field, twenty feet from the river, so rapidly had the water subsided. In this dilemma, as I knew the people, I told them that the English had brought a steamer up for them to see, and were so anxious that the people should see the whole of her that they had put her aground. The people came round in crowds to see her; but we remained there six weeks before we could move her. As a measure of precaution, we erected defences around her in case of attack. We took out the engines, and almost lost them; for as soon as we had taken them out, the water rose as suddenly as it had fallen, and we had considerable difficulty in getting them into the vessel again. I think, as far as the inhabitants of the country are concerned, that we have nothing to fear from them.

COLONEL SYKES, F.R.G.S.—At what time of the year was that?

MR. LAYARD.—I think it was in April or May.

THE PRESIDENT.—Will Sir Henry Rawlinson be so good as to offer some observations upon Herat?

SIR H. RAWLINSON.—I was asked a question just now by Mr. Frith with regard to Bassadore, which I will answer before entering on the subject of Herat. Bassadore is the name of the station in the Persian Gulf where the ships of our squadron have their several depôts, and where the general naval hospital is also established. It is situated on the island of Kishm, at its north-western point, and is the port at which all the ships usually touch in their passage up and down the Gulf, and where, on the present occasion, the fleet rendezvoused preparatory to the attack on Bushir. This position of

Bassadore was granted to us by the Imam of Muscat, to whom the island of Kishm belongs, at the period of our expedition against the pirates of the Gulf, and it has answered our purpose quite sufficiently up to the present time. It is possible, however, that in the course of the present operations the station may be changed; instead of Bassadore we may perhaps occupy the island of Karak or some other more convenient station. Bassadore is our own soil at present, but it is not a good position for a naval station. There is a great deficiency of water, and the place is too distant from Bushir and Bussora to be of any political weight. If we were able to exchange it for some other place nearer at hand, it would certainly be to our advantage.

With respect to Karak, I do not altogether agree with the observations contained in General Monteith's paper. Although the island is sufficiently supplied with water, and is moreover conveniently placed, it possesses the worst anchorage perhaps throughout the Gulf. If it ever become, indeed, a place of any importance, it will be so, not *in consequence* of its physical character, but rather *in spite* of it. The whole island is a mass of coral rock, and it is only one particular corner of it that is habitable. At this corner the rock is covered with a small patch of soil, which suffices for a scanty cultivation; here is erected the fort, around which are a few gardens, but there is no harbour, nor even a roadstead. Vessels ordinarily anchor out on the southern coast of the island, where they are sheltered from the prevailing north-westers, but immediately the wind shifts and blows from the south-east they are on a lee-shore; so that they generally have to lie with springs on their cables, prepared to slip immediately the wind shifts and run round the point for shelter; they lie again on the northern side of the point until a north-wester comes, then they have to return to the anchorage S. of the island. That is such a disadvantage for merchant vessels, that really I cannot contemplate the possibility of an island so circumstanced ever becoming a great commercial emporium. At present merchant vessels will never anchor off the island, unless compelled to do so; they used merely to pay short visits to the island during our previous occupation, taking up their permanent anchorage in Bushir roads. Owing to this great maritime defect I should be very sorry to see any attempt made to turn Karak into a commercial emporium, like those which previously existed in the Gulf, for I am confident such an attempt would fail. If it had been a place where it was possible to establish an emporium, no doubt it would have been selected for the purpose before this, as its geographical position is excellent. At the same time, as it happens to be in the line between Bushir and the mouth of the Euphrates, it may perhaps be of some use as a telegraphic station, and as such we might retain it, but I cannot see any other use for it.

Other questions have been addressed to me with reference to a subject which is almost too great to enter upon just at the close of the meeting. Still if the meeting be desirous to hear a few words upon the geography of Herat, I shall be quite prepared to offer them. I mentioned before that we have been twitted with ignorance on that subject. It is sufficiently discouraging to geographers, and especially to this Society, which has been established for the promotion of geography, that the great leader of the English press—which may be considered as the exponent of the intelligence of the English nation—should profess an entire ignorance on the subject of Herat, not only ignorance of its geography, but actually of the country to which it belongs. We were told not long ago that its position was not known within a degree of longitude, and that it was a doubtful point in political science whether it belonged to Afghanistan or Persia. Now I hardly think that is a fair statement of the case, and I am glad to see that such ignorance, either real or affected, has not been endorsed, generally, by the public feeling of England. If you cast your eyes on Mr. Walker's map of the N.W. frontiers of India, suspended on the

wall, you will find Herat most accurately, scientifically, and clearly laid down, for the position was determined by Colonel Sanders, of the Bengal Engineers, by chronometer, by observation, and by triangulation, from the Indian base. The question as to whether it belongs to Afghanistan or Persia I will answer in a few words. Persia has belonged to Herat, but Herat has never belonged to Persia, as an integral portion of her territory. After the death of Timour (or Tamerlane), his son, Shah Rokh Mirza, established his capital in Herat, and during his reign the whole kingdom of Persia was thus in dependence on the city. After that time, Herat was generally an independent country. During the time, however, of the Seffevis, for a short period the Persians obtained forcible possession of Herat, as they also did of Bagdad, and so far as a right by conquest is concerned, they have as good a claim to one city as the other. The Seffevis were succeeded by Nadir Shah, who first placed the Dorani tribes in Herat. At his death Ahmed Shah instituted the Affghan monarchy, and from that time to the present Herat has always been an independent Affghan principality, so that the Persians cannot possibly lay any territorial claim to Herat. Having thus cursorily noticed the political character of the country, I will now say a few words with regard to its geography. It is frequently said that all the great lines of route through Asia centre at Herat, and that it derives its importance from this circumstance, but this is not by any means the case. Herat is of importance for the following reasons. Firstly, because it lies upon the high road from Persia to the Indies; there being no other route. Every caravan, indeed, army, or anything else, coming from the west, must necessarily march by Herat to enter Afghanistan. Then, again, the district round Herat is probably the richest in Asia; and there is this further peculiarity, which is a great military advantage, that in the same line there happens to be at a convenient distance another district of almost equal fertility. Herat is the first station, and Nishapore is the second. These two are situated at a convenient distance from each other, and can furnish supplies to an almost unlimited extent. To obtain a just idea of the fertility of the district, we have only to remember that the army of Mahomed Shah in 1838, from fifty to sixty thousand strong, remained in the neighbourhood of Herat for more than ten months, drawing supplies from the villages around without experiencing any scarcity. In that district there are four or five hundred rich villages with abundance of water, and the plain is one continued sheet of cultivation for 50 or 60 miles in extent. Lastly, the city itself is of extraordinary military strength, being surrounded by a great mound of earth, such as we call a "*fausse-braie*," of enormous height (80 or 90 feet high), and at a considerable slope. Upon the slope also is a double line of trenches which traverses to protect them from an enfilade fire. The place is thus quite strong enough to protect itself from any *coup de main* on the part of Oriental assailants; and if improved by a few scientific additions, such as flanking defences, escarpment of the ditch, &c., it would present a sufficiently formidable front even to a European army. In the recent affair, it must be remembered, it was not taken by the Persians, but it capitulated for want of provisions. The siege might have been protracted six months longer, without much risk of danger, if the garrison had been only furnished with supplies. From Herat to Candahar the country is quite open and sufficiently easy; there would indeed, to use a familiar illustration, be no difficulty in driving a four-in-hand the whole way. The mistake that we are in the habit of making in considering Herat, is that we put it in the same category with Cabul; but this is altogether wrong. It is an error that has obtained a general belief without any reason whatever. Herat has, in fact, no connexion with Cabul, either geographically, politically, or physically. The Cabul line to India is no doubt extremely difficult, almost impracticable for armies; whereas the country from Herat to Candahar, below the hills and so on to the plains of Sinde, is perfectly open,

and practicable for troops in every direction. It should be remembered, indeed, that during the whole of the Affghan war we never had a reverse or even a check in Western Affghanistan, with the exception of that single affair of Sir Richard England's at Hykelzye; so that it is hardly fair to place Herat and Candahar in the same category with Cabul. At present the Persians are in occupation of Herat, and we are at war with Persia for the purpose of compelling her to evacuate the city and restore it to the Affghans. It is to be hoped, and I confidently expect, that the war will have that effect. But if it be otherwise, if the Persians do not evacuate Herat, then comes the question, what are we to do? It is very currently believed that the forces sent up the Gulf, are for the purpose of marching on Herat; but that is an absurd idea, that could never have entered into the imagination of any person acquainted with the country. The country between Shiraz and Herat, being for the most part a salt desert, is perfectly impracticable to an army; but I am not prepared to say that, in a geographical, physical, or military point of view, there would be any difficulty in marching a force from our own Indian frontiers to Herat, in order to expel the Persians from the city. I should be sorry to see such a campaign undertaken, because of the expense; but the movement is perfectly practicable, and would almost certainly be successful, if we were content with the one definite object of recapturing Herat. In the former Affghan war, all our disasters arose, it might be remembered, from alterations of the original plan. Having marched through Affghanistan and placed Shah Shuja on the throne, our work was accomplished, and we should have retired, but, instead of returning, we remained in the country, and thus exposed ourselves to disaster. In the same way, if we were now to march upon Herat, and, having expelled the Persians, were to insist on remaining in military occupation of the place, we might be subjected to great difficulties on account of the exceptional position of the country. In England, we are apt to forget that the social condition of Affghanistan, is different from that of any other eastern country. Throughout Candahar and Herat, and partially in Cabul, the lands are in possession of a privileged class, the Dorani aristocracy. These chiefs possess great power, and are, in fact, the lords of the country, holding their vast estates on a sort of feudal tenure, and having the peasantry under them. Now the Doranis would necessarily be put on one side, if we were to assume the government of the country; and foreseeing their fate, they would thus be predisposed to become our enemies. It would be vain indeed to attempt to hold the country, unless the Doranis were removed; and although the Persians might not scruple to undertake such a work of depopulation, the English of course could not accept its responsibility. In the times of Sennacherib and Tiglathpaleser, such things were often done,—whole nations were transported from one country to another, and similar means are still occasionally resorted to in the East, for taming a turbulent population. But the British Government, in the nineteenth century, could not of course be a party to any such proceeding. I repeat, therefore, in conclusion, that if we are content to march on Herat, expel the Persians, and return to India, there is no difficulty or danger in the enterprise; but that, if we attempt to retain a permanent footing in the country, we shall inevitably incur disaster.

The PRESIDENT, in conveying the expression of the thanks of the meeting to Sir Henry Rawlinson, regretted that the lateness of the hour alone (it being near eleven o'clock) prevented a more lengthy discussion on the subject then under notice. He saw present several travellers who, from their personal knowledge of the country, could no doubt have afforded them very valuable information. He must, however, adjourn the meeting until the 23rd instant.

Eighth Meeting, Feb. 23, 1857.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS.—*Walter Bryant ; John Gilchrist ; and Z. D. Hunt, Esqrs., were officially introduced upon their election.*

ELECTIONS.—*The Hon. A. Kinnaird, M.P. ; Capt. W. A. Willis, R.N. ; Lieut. J. H. Glover, R.N. ; and H. M. Addey ; E. Coghlan ; D. Stewart Dykes ; T. K. Fletcher ; S. L. Howard ; and J. S. Sherrin, LL.D., Esqrs., were elected Fellows.*

DONATIONS.—The following were among the donations since the former meeting :—The ‘Atlas Geografico Estadístico é Historico de la Republica Mexicana,’ par Antonio Garcia y Cubas, presented by the author, through General Almonte, the Mexican Minister ; the ‘Map of Scinde,’ in four sheets, by the Quartermaster-General (Bombay) Colonel Neil Campbell, presented by Lieut. Watson ; a copy of ‘Meteorological Observations made during the progress of the Survey of Ireland,’ by order of the Secretary for War, and further contributions from the Ordnance Map Office, consisting of 274 sheets of Yorkshire, on the scale of six inches to a mile ; the 6-inch maps of Fife, Kinross-shire, and Linlithgowshire ; plans of several towns on the 5-foot scale, extending to 1360 sheets ; maps of Aldershot, &c., presented through Colonel James ; No. 18 of Dr. Blackie’s Imperial Atlas ; MS. Maps of ‘Bahia de Todos os Santos,’ presented by E. Porter, Esq., F.R.G.S., &c.

ANNOUNCEMENTS.—It was announced that a letter had been received from Sir J. C. Melvill, Secretary to the Honourable East India Company, informing the Council that the Society would be furnished with a complete set of the Company’s charts, together with nautical directions and other maps and works relating to geography.

EXHIBITIONS.—The PRESIDENT called attention to the bust of Dr. Livingston, by Mr. Miller.

AUDITORS.—Thomas H. Brooking and E. Osborne Smith, Esqrs., on the part of the Council ; and H. Raper, R.N., and Francis Le Breton, Esqrs., on the part of the Society, were appointed Auditors.

The papers read were :—

1. The Secretary read extracts from notes on the Expedition up the Nile, communicated to him by M. Le Comte d’Escayrac de Lauture. The naval portion of the expedition under the command

of our countryman, Mr. Twyford, although with great difficulty, had ascended for the first time with steamers the celebrated cataracts of the Nile, and early in January had arrived in the town of New Dongola. The Count, however, had been obliged to suspend operations until the next season.

COLONEL SYKES, V.-P.R.G.S., said he held in his hand a letter from the Comte d'Escayrac de Lauture to the Secretary. In it he complained that the Germans attached to the expedition threw impediments in the way. He also said that the Austrians had a mission at Khartúm, on the White Nile; and when the Pasha sent troops for the safety of the traders up the river, he found that the Austrian missionaries had distributed little Austrian flags, which had produced a great effect in Egypt, as if they were going to act the part of the Spaniards in South America. The Comte adds—"I am very glad that it was an Englishman who achieved this first success in thus ascending the cataracts of the Nile. With respect to Twyford, I have thought it right to increase his salary." Then, he continues, he had no doubt this great enterprise would experience very great obstacles; "but with the two people, the English and French—France bold, and urged on by the love of glory; England patiently indifferent to obstacles, and always looking to the future—there can be no doubt about the ultimate results of the expedition."

The PRESIDENT said that M. d'Escayrac had already distinguished himself by the excursions he had made in Africa. He was a French gentleman who had devoted himself to the cause of geography, and was therefore entitled to the consideration of that Society. He had, at the request of the Pasha, invited gentlemen of different countries to accompany him in this expedition, and it was gratifying to find that with none of his companions had he been more satisfied than with Mr. Twyford, the young English sailor.

2. *Proposed Communication in Asia Minor, between the Lake of Sabanja, the River Sakaria, and the Gulf of Nicomedia.* By General JOCHMUS.

Communicated by Sir RODERICK I. MURCHISON.

HISTORY establishes that in ancient times the utility had been already recognised of a communication between the Black Sea and the Gulf of Nicomedia, by means of canals which should connect, on the one hand, the river Sakaria with the lake of Sabanja, and on the other, this lake with the Gulf of Nicomedia, directly, or by way of the little river Kara-su.

Down to the end of the last century, the question of this system of canalization had been seven times agitated; *first* in the time of the kings of Bithynia; *next* under the Emperor Trajan; *then* under two Byzantine Emperors—Anastasius and Alexis; and again during the reigns of the Sultans Bajazid II., Mohammed IV., and Mustapha III.

In ancient times there were technical objections to the execution of this great enterprise; a magnificent Roman bridge 800 feet in length, however, still exists, which, in the environs of Ada-bazár,

thrown across one of the natural outlets of the lake Sabanja into the Sakaria, attests the importance which the imperial (Roman) government attached to the means of communication in the rich province of Nicomedia. At a later period, under the Ottoman Emperors, measurements and levels had already made known the facility and the incontestable advantages of the hydraulic works then projected.

The Grand Vizier in the year 909 of the Hegira (A.D. 1503) caused the following facts to be made known.

The distance from the river Sakaria to the lake of Sabanja is 9600 siraas (or 19,200 French feet, or about $3\frac{1}{2}$ miles). The distance from the lake to the Gulf of Nicomedia is 22,000 siraas (or 44,000 French feet, or scarcely 9 miles). The difference of level nowhere interposes a difficulty.

Between the Sakaria and the lake there already exists a natural communication by the little river of Sari-déré; and according to the report of Sinan Pasha, it was intended to form a direct canal there,—or rather merely to deepen the bed of the Sari-déré, and to cut a canal throughout the distance of only 2200 feet. To effect the more important communication, that between the lake and the gulf, Sinan Pasha wished to cut a direct canal between Nicomedia and the lake; but it must be observed that the Roman governor Pliny proposed to the Emperor Trajan, either a direct canal, or one considerably deviating from a direct line, which he projected to communicate with the river at present called the Kara-su.

In the year 1172 of the Hegira (A.D. 1758), the Grand Vizier, Raghib Pasha, revived the same enterprise, in order to give occupation to the poor of Constantinople, then threatened with famine by the failure of arrivals of corn from the Black Sea; and he gave the direction of the works to an Hungarian, the celebrated General de Tott, who was at that time in the service of the Sublime Porte. The Memoirs of the Baron de Tott* prove that there exists no technical difficulty to oppose the execution of these hydraulic works; but the project was nevertheless abandoned, because, the famine having been stayed, popular commotions at Constantinople were no longer feared. The historiographer, Wassif Effendi, however, has related that some individuals, interested in hindering the projected canalisation, found means to bribe certain influential public officers, who caused the works to be discontinued, the traces of which are still to be seen.

Raghib Pasha had it especially in contemplation, to insure for

* See Von Hammer.

the capital, in time of peace, as well as of war, by means of an internal communication, plentiful supplies of corn, provisions, and wood, independently of the customary arrivals from the Black Sea and the Mediterranean.

The idea of connecting the Black Sea and the Gulf of Nicomedia through the lake Sabanja was again taken into consideration during the reign of Sultan Mahmoud, of glorious memory; but it seems that a certain Osman Effendi represented that the establishment of this system of canals might facilitate the entrance of a hostile fleet from the Black Sea into the Sea of Marmora, or even military operations against the capital; and these considerations were amongst the principal causes of the last abandonment of this great and noble enterprise.

The danger is altogether imaginary. The undersigned has travelled through the provinces of Nicæa, Nicomedia, &c., and he is firmly convinced that no hazard to Constantinople can arise from the canalisation in question. It is not intended to establish a water communication for ships of the line and frigates, but rather for coasting vessels and small steamboats; and thus to provide for the capital all the advantages of an extensive internal navigation, and a means for the continual and cheap supply of wheat, barley, straw; wood for fuel, carpentry, and shipbuilding; charcoal, and other articles of daily consumption.

The country around the Lake of Sabanja, and all along the river Sakaria both upwards and downwards, is remarkably rich in timber and vegetation, and is capable of the highest culture. Though even at present in a very satisfactory and prosperous condition, its productive powers are susceptible of very great augmentation. It is superfluous to add, that the city of Nicomedia, and the public establishments already existing or to be founded there, would derive considerable advantages from the canals indicated. It may, besides, be considered certain that the tolls to be paid by vessels, as well as the augmentation of the public revenues, and of the value of the forests and other state property in the province of Nicomedia alone, would pay the most liberal interest for the capital expended on the hydraulic works.

What has been stated as to the advantages offered to Constantinople and the province of Nicomedia, relative to the supply of provisions to the capital by means of an internal communication, will also apply nearly in an equal degree to the country around the Lake of Nicæa. The distance from the Lake of Nicæa to the Gulf of Gemlik is nearly the same as that from Lake Sabanja to the Gulf of Nicomedia, with the difference, however, that there already

exists a natural communication between the waters of the Lake of Nicæa and those of the sea. It would, then, only be necessary to form into a canal this channel, by which water from the lake is discharged into the sea, to secure a way for the water-transport of the products of its shores, scarcely a fourth part of which are cultivated.

On the two great Lakes of Nicæa and Sabanja there does not exist at present a single vessel of transport, whilst there are a hundred and sixty small vessels on the Lake of Apollonia, which carry on a lucrative commerce with Constantinople by way of the river of Muhalitch; although the banks of this lake are not nearly so rich or important as those of the Lake of Nicæa, or especially as those of the Lake of Sabanja.*

Constantinople, 25th May, 1846.

The PRESIDENT said this was one of several communications, most of them of greater length, on the comparative geography and ancient encampments in Greece and Asia Minor, prepared by the General and sent to the Society. These would in time be laid before the Fellows in the publications of the Society.

MR. W. J. HAMILTON, F.R.G.S., said, that although he had not visited the particular district alluded to by General Jochmus, he was acquainted with some of the physical features of the country almost immediately connected with it. As far as he had been able to follow the paper, it appeared, with regard to the canalisation between the lake Sabanja, the river Sakaria, and the Gulf of Nicomedia, that General Jochmus proposed that the lake Sabanja should be the principal source whence the water would be derived for the purpose of canalizing the district and supplying the different sluices. He imagined that the bed of the river Sakaria, flowing as it did between a mountainous region and the Black Sea, must be at a higher level than the lake Sabanja; consequently the water would flow from the river into the lake. He did not mean to say that that would offer any great difficulty. The district was one of the best watered in Asia Minor. The Sakaria rose in the interior, and had a very abundant supply of water; and, therefore, if the river Sakaria was higher than the lake Sabanja, would not offer any material obstacle. But the country between that district, and extending northward to the Black Sea,

* Constantinople, 31st May, 1847.

M. Hommaire de Hell, to whom I communicated this memoir, addressed a note to his Excellency the Grand Vizier, Reshid Pasha. His levels are founded merely on approximative data; and although it might be less expensive to make a railroad between the Lake of Sabanja and Nicomedia, an inspection of the ground between the Lake and the Black Sea, which down to the present time has not been examined by M. de Hell, will probably prove that the establishment, in that part, of a canal would be more practicable and perhaps also less costly. There still remains the consideration of the double or triple embarkation and shifting of goods, necessarily expensive, if a railway were to form a part of the line, and the transport were to be effected partly by the Lake of Sabanja, then by land, and lastly by sea. M. de Hell is in error if he believes himself to be the first person who has taken the elevation of the ground in question, as Von Hammer has indicated the exact levels, twice estimated in 1503, by order of the Turkish government, between the Lake of Sabanja and the Sea of Marmora, as well as between this lake and the Sakaria; but there is a great difference between the results obtained in 1503 and in 1847.

was very mountainous; and the probability was that the river must flow at a considerably higher level than the Sabanja. Between the lake and the Gulf of Nicomedia there was no great difference of level. The country also being a mountainous one was not likely to offer any of those facilities for navigation which it appeared the Turks contemplated at a former period, and which was one of the reasons why they objected to give any sanction to the undertaking. The other lake mentioned by General Jochmus he was not acquainted with. The lake Apollonia certainly had a communication with the Sea of Marmora, but from what he saw in the neighbourhood of the town of Apollonia, he should not have imagined there was anything like the number of vessels mentioned by General Jochmus. It might be so. The country, particularly to the northward, was very fertile; vineyards and silk abound; and the trade with Constantinople was very considerable. There could be no doubt that the opening out of this system of canals between Sabanja and Sakaria would very materially facilitate commercial transactions from the Sea of Marmora to the Black Sea.

3. *On the Geography of the Sea of Azov, the Putrid Sea, and the adjacent Coasts, with Remarks on their Commercial Future.* By Capt. SHERARD OSBORN, R.N., C.B., F.R.G.S. [*Abstract.*]

AMONG the hydrographical features of the Sea of Azov, the author alluded to the configuration of its bottom, which, at the greatest depth, seldom exceeding 40 feet, forms a flat in the centre of the basin, extending about 55 miles east and west, and 35 miles north and south. Between this flat and the coast the bottom slopes for the most part gradually, the inclination being generally one foot in a mile between the depths of 30 and 40 feet, and rather more abruptly in shallower water. The regularity of this slope is, however, occasionally interrupted by banks, adjacent to some of the remarkable sandy spits which characterise the coasts of this sea. The Obitochna Banks, S.E. of the spit bearing that name, are attributed to volcanic action, the effects of which in this sea were distinctly exhibited in the occurrence of a submarine eruption in Temriuk Bay, in 1799, described by Pallas. Volcanic phenomena in various forms also occur on the peninsulas of Kertch and Taman. The only rock known to exist within the whole extent of this sea was discovered near the north coast, eastward of Berdiansk, and has been called after H.M.S. Vesuvius.

The sandy spits are constantly extending, and present a steep face, rising out of deep water, against the current from the east; while towards the west they form shoals which are always increasing. These spits are inhabited by fishermen employed by wealthy companies, and wild fowl abound on them. The constant extension of the spits appears to be accompanied by a general diminution of depth, which is said to have amounted to 6 feet in 127 years. This result is hastened by the discharge of ballast from

trading vessels, which the author observed in the form of knolls, all over the bottom near Taganrog, and in the bights off Berdiansk and Mariopol. These knolls form nuclei for fresh alluvial deposits.

The author also described at some length the winds and currents of this sea. He pointed out the influence of the winds on the depth of the water, which strong breezes had the effect of blowing away on the one side and heaping up on the other. The spits afford a shelter against easterly winds, but there is no protection in any part of the sea against the westerly gales. With reference to the currents, the author differs from M. Taitbout de Marigny, who asserts that there is little current in the Sea of Azov. This is maintained to be an error, and the influence of the winds on the motion of the water is regarded as a sufficient indication of the existence of currents, and various examples were given on this point. The rivers also contribute to produce currents from three quarters, viz. the delta of the Don, the Sivash, and the rivers between Taman and Kamisheva. From the entrance of the Gulf of the Don the current passes in three branches:—1st, along the north coast, as indicated by the direction of the spits, at the rate of a knot or a knot and a half per hour; 2ndly, through the centre of the sea, on a S.S.W. course, with a velocity of about one knot per hour; and 3rdly, in a direction nearly due south to Kamisheva Point, curving round from thence to the Jelezin Bank, where it connects itself with the outflow from the deltas of the Kuban, Protok, Baysough, and runs out through the straits of Yenikali.

The physical features of the Spit of Arabat and of the Sivash or Putrid Sea were described from observations made during the late campaign, and the author also dilated upon various topics relating to the surrounding regions, dwelling considerably upon the importance of the Ciscausian Region, both geographically and commercially, and pointing out that it forms the natural highway to Persia and Northern India from Central Europe. Captain Osborn said that a traveller might yet go from *Vienna to Asterabad*, *viâ* the Danube, Black Sea, Valley of the Kuban, and Caspian, in a fortnight.

The PRESIDENT returned thanks to Captain Sherard Osborn for his communication, so remarkable for the variety of subjects touched upon. It embraced, in fact, the history of the southern regions of Russia. But there were some points connected with the Sea of Azov to which he should like to recall attention. For example, the title of the paper was upon the commercial future of the Sea of Azov; but Captain Osborn had not told them how many hundreds of years would elapse before the whole of the Sea of Azov was filled up. He—the President—had been along the northern edge of that sea, and could bear testimony to the fidelity and accuracy which Captain Osborn had displayed in his description as to the great mass of matter brought down the Don, and the way in which it accumulated on one side of the spit and edged round to

the other, and as to the uniform character of these spits, being precipitous on the east side and shelving on the west. He would ask whether, in observing these spits from Berdiansk to Taganrog, Captain Osborn had noticed that they were composed of a solid subsoil of tertiary rocks, which on the east side had been eaten down into precipices by the action of the sea, while on the other it was covered with merely alluvial accumulations? He apprehended that these spits were erosions of ancient tertiary cliffs, with which he was tolerably acquainted himself. Another point, upon which Captain Osborn had remarked, was that there were portions of the sea very saline, and others not so. That phenomenon existed, not only throughout the Sea of Azov, but also in the Caspian, and was due to the presence of subterranean salt-rocks which cropped out here and there in great masses. The Russians could have any amount of rock-salt they pleased. The modern Azov must be far from the ancient town, as in the great siege, ships went up to the walls of the town.

CAPTAIN OSBORN said that the statistics to which he referred affirmed that the sea had diminished six feet in 127 years. If it continued at that rate, it would fill up in 350 years; still he thought the Don and other large rivers which discharge into this sea would always cut a channel for themselves. The Russians asserted that the Caspian had deepened, although there was no outlet out of the Caspian, and two or three large rivers discharged themselves into it on the northern side. Having stated that in 1672 the Russians found six feet of water on the bar of the Volga, and in 1743 twelve feet, he was told that at Asterabad, the Persians could point out villages under water and trees that had been covered, and that where animals could ford at one time, there were now two fathoms of water. It was a question, therefore, whether there might not have been a subsidence in the bed of the Caspian, and whether the Sea of Azov might not be preserved in a similar manner. If the calculations were correct that it would be filled up in 350 years, he thought it must have been filled up along ago. With reference to the spit, it was evident, as Sir Roderick Murchison said, that there had been a rock as a nucleus for the spit to form upon. Beyond these spits again, he found knolls formed by the discharge of ballast from vessels. Around these knolls the mud was deposited rapidly, forming perfectly cone-shaped shoals, and in a short time a series of these soon got connected together. If some means were not taken to put a stop to this system, the sea would in a short time hardly be navigable.

MR. LAURENCE OLIPHANT, F.R.G.S., said, it was five years since he went over these countries, still he could quite corroborate what Captain Osborn said with respect to the current in the Sea of Azov.

The commercial aspect of affairs in that country was very interesting to a stranger. The prohibitive system of Russia had nowhere been more strongly developed than there, and its deleterious influence was clearly perceptible. Kaffa was the natural outlet for the commerce of that country, but the Russian government had forced the commerce to go by way of Taganrog and Kertch. In judging of the period that would elapse before the Sea of Azov filled up, it would be necessary to take into account the conduct of the Russian officials. The Sea of Azov had been in existence 2500 years, to our certain knowledge, and they could hardly calculate that it would fill up in 350 years. But the Russian officials were doing all they could to fill it up. Vessels arriving at Taganrog were strictly forbidden to throw out ballast, but upon payment of a bribe, the Russian officials allowed it to be thrown out. The consequence was, that, as Taganrog prospered, the harbour got filled up, and in time he supposed it would be so prosperous that there would be no harbour at all. The import duties levied by the Russian government were so high that vessels could only go in ballast. With respect to the country of the Don Cossacks, which he had crossed from one end to the other, he could only say that a more dreary, desolate, and detestable country he never travelled over. The Tchernozème,

or black soil peculiar to the country, might produce fine corn, but it was wonderful how little corn could be seen in crossing the country. He saw plenty of dried-up grass.

The PRESIDENT.—In what season?

MR. OLIPHANT.—In October; but still he did not see evidences of cultivation. The idea which forced itself on the mind, in considering this fertile country teeming with resources, was, not that it was improving rapidly, but that it should have improved more rapidly. The country between the Kuban and the Caucasus was one of the most magnificent in the world. It consisted really of savannahs; the grass in the valleys grew six or eight feet long. The character of the country of the Don Cossacks was quite different; there the steppes were undulating, like a sea in a heavy swell. There was no nation, he believed, that understood less the development of the resources of a fertile region than the Russian. If it had been in the hands of the Americans, the aspect of affairs would have been very different. Were they to possess it for twenty years, the harbours, instead of being choked up, would be used as the natural outlets for the produce of the country, if they were available for the purpose, nor would places be chosen for ports which were the very worst that could be selected. Taganrog, Kertch, Gheisk, ought not to be ports at all. He would explain why Kaffa was the natural outlet of the country. At Taganrog, vessels had to anchor several miles off the coast, and the corn which was brought down the Don, had to be reshipped four times before it was finally deposited in the hold of the vessel, after it had passed through the straits of Kertch. Whereas, if Kaffa was the emporium, lighters could come right down even from Tcherkask without ever taking out their cargo, and the whole commerce of the country would be concentrated there. He believed Kertch was a pet place of Prince Woronzoff, and Taganrog was created by the Emperor Alexander; these places had been selected not because they were the natural outlets for the country, but because certain individuals took a fancy to them.

The PRESIDENT.—It is the fact that the natural filling up of the sea has occasioned them to move ports farther towards the water.

MR. OLIPHANT.—Just so. The anchorage at Taganrog is 20 miles off.

CAPTAIN OSBORN.—There is an anchorage about 6 miles off straight south of Taganrog.

MR. OLIPHANT.—The merchant vessels were at anchor an immense distance off when I was there.

Ninth Meeting, March 9, 1857.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS.—*Capt. W. A. Willis, R.N.; Lieut. William Chimmo, R.N.; Dr. J. S. Sherrin; and D. S. Dykes, T. K. Fletcher, and S. M. Howard, Esqrs., were officially introduced upon their election.*

ELECTIONS.—*Col. P. Anstruther, C.B.; Capt. W. J. Eastwick; the Rev. Dr. Elder; the Right Hon. Lord Falkland; Commander F. K. Hawkins, R.N.; Dr. E. Hamilton, M.D.; Capt. Jenkin Jones; Col. the Hon. W. L. Pakenham; the Lord Bishop of St. David's; Sir Justin Sheil, K.C.B.; the Earl of Shelburne; Sir W. Fenwick Williams of Kars, Bart.; and R. Sinclair Aytoun, E. G. Culling Eardley, Thomas Gillespy, W. B. Green-*

field, G. W. Lennox, W. B. Long, J. C. Marshman, and A. Swanzy, Esqrs., were elected Fellows.

DONATIONS.—Among the principal donations received since the last Meeting, were Plans and Sections, published by the War Department; ‘Perceement de l’Isthme de Suez, etc.,’ by M. F. de Lesseps; and the Journals of the Scientific Bodies of France, Prussia, the United States, and Canada.

EXHIBITIONS.—Lieut. W. Chimmo, R.N., F.R.G.S., exhibited certain relics connected with the search for the North Australian Expedition under Mr. Gregory, found on the coast of the Gulf of Carpentaria and on the banks of the Victoria River, and referred to in his Paper in the ‘Proceedings.’

ANNOUNCEMENTS.—1. The President said that a letter had been just received from Captain Richard Burton, announcing his arrival at Zanzibar, on the east coast of Africa, and his intention to proceed, as speedily as possible, for the interior, in search of the Great Lake.

2. The Twenty-sixth Volume of the ‘Journal,’ and the Seventh Number of the ‘Proceedings’ of the Society, were next announced as having been published that day.

3. It was then announced that a letter had been received from the Earl of Shelburne, enclosing, by direction of the Earl of Clarendon, a copy of a despatch from Her Majesty’s Minister at Lisbon, stating that the Viscount de Sa da Bandeira had, by order of the King of Portugal, transmitted the vote of thanks, passed at the Special Meeting of the Royal Geographical Society on the 15th of December, to the Portuguese Authorities of East and West Africa, for their kind reception of the intrepid Dr. Livingston.

*Address by Sir Roderick Murchison on Opening the Meeting of the
Royal Geographical Society, March 9, 1857.*

GENTLEMEN,—An attachment resulting from and cemented by an intercourse of nearly thirty years’ duration would naturally have led me at our last meeting to express to you my grief upon the occasion of the decease of my valued friend the Earl of Ellesmere; but the grave had not then closed over his remains.

Now, that the sad ceremony has been performed, in the presence of many a true mourner and amid the wail of a devoted tenantry, I cannot allow this the first opportunity presented to me to pass, without giving utterance to the feelings of sincere sorrow which I experience, in common, I am sure, with all members of the Royal Geographical Society, upon the loss of such a man.

Of him, I may well say that his whole career was as honourable to himself as it was useful to his country; for his knowledge of our pursuits was one only of the many accomplishments in science, letters, and arts, which his

bright mind had mastered, whilst his urbanity, benevolence, and kind-heartedness, shone forth in every transaction of his well-spent life.

This is not the time, Gentlemen, for me to dwell longer on the lofty character of our deceased former President ; but at the ensuing Anniversary it will be my earnest endeavour to prepare, with what power I possess and all the love I bore him, a brief biographical sketch of one, who, whether we judge him by his private or his public worth, was pronounced by all who knew him to be the perfect type of an English Nobleman.

The papers read were :—

1. *Remarks on the Geography and Hydrography of South-Western Africa.*

By JAMES CAMPBELL, Esq., Surgeon, R.N., F.R.G.S.

H.M.S. 'Plumper,' St. Philip de Benguela,
February 18th, 1856.

THE river Zaire, or Congo, is the largest arterial stream of Western Africa south of the equator, and discharges itself into the ocean in lat. 6° to $6^{\circ} 08'$ S., and long. $12^{\circ} 12'$ E. It was explored for some distance, in 1816, by the expedition under Captain Tuckey, R.N., and is laid down as having an E.N.E. direction up to the termination of his ascent. The object of this voyage appears to have been for the purpose of ascertaining the correctness of the theory promulgated by Park, viz., that this river was identical with the Niger, and constituted its embouchure, which has long ago been negatived by the explorations of the Landers. It was surmised by Captain Tuckey and others, that its source was to the northward of the equator, in a large lake or lakes, probably not far from the southern declivity of the Donga mountains ; but the periods during which it undermines its banks, as evidenced by floating islands, increase of current, and height of water at its mouth, point to a different direction.

The wet season in the Bight of Biafra extends from May to October, and the quantity of rain that falls is enormously great ; but even in the dry season, which comprises the remaining months, there are sudden though temporary deluges. On the sea-board of the Congo country—and we may assume its interior to be similarly season-governed—there are two showery seasons : one from October to December, and a second from March to May. These, as compared with the rains of the windward and leeward coasts north of the equator, do not deserve the appellation of "wet season," for the showers are of no duration or intensity. In the interior, however, the fall must be considerable, and, indeed, at a distance of thirty miles from the entrance of the river a marked increase of rain is experienced. As it is during those so-called "wet months" that the Congo is at its highest level—December in particular—we may

justly conclude that its source, or at least the parent stream—should a confluent really exist to the north—is within a few degrees south of the latitude of its mouth, but at a great distance inland. This hypothesis is strengthened by the recent exploration and traverse of Southern Africa by Dr. Livingston, who saw a large river in lat. $11^{\circ} 17'$ S., and between the 22° and 23° E. long. He has mapped it under the names Casai, or Loke, and describes it as about 120 yards broad at the above position. The stream was forded at the same place, and was described by intelligent natives to form the Zaire or Congo river. It was flowing to the N.E. He also forded another large stream called the Coango or Quango, “the Tortuous,” in the valley of Cassangé, the width of which was about 150 yards, and flows nearly north. This river was forded in $9^{\circ} 51' 28''$ S. lat., and about the 19° of E. long. The inhabitants and Portuguese traders described it as flowing into the Congo.

I apprehend this traveller's data will decide the geographical position of the source of the River Congo.

The hydrographical features of this river have been displayed by Captains Owen and Vidal in their survey of its entrance; but they and others appear to have omitted two peculiarities connected with its seaboard and bed :—

First.—That the crescentic portion of land extending from a little to the southward of Point Padron to Shark Point, is evidently due to the reproductive effects of marine and fluvial action. On the river-side, the large Bay of Diegos skirts the annexed land, and in some places dips into it in the form of creeks. This portion is densely covered with the trees and bushes usually seen at the entrance of tropical tidal rivers, and has a black loam with fine sand for a soil. It is very little elevated above the sea, and is flat. This bay is of little depth, has a muddy bottom, and I believe will, at no distant era, be reclaimed from the river by the silting up of this part of its bed. The sea-bordering portion, on the contrary, is more sparingly covered with vegetation; there are none of the giant mangroves to be seen, and its trees are of much less altitude. The soil is composed of attrited shell, mixed with sand, and is considerably elevated—about 15 feet—above the sea; so that in crossing the narrow belt from seaward it forms a miniature hill before reaching the alluvial detritus on the river-bank. Having had my attention called, whilst serving on the Newfoundland coast, to the action of the sea in raising a sandy spit between and joining the French island Miquelon, I feel confident that the ridge or ridges—for a succession of them can be detected—have been thrown up by the heavy surf, which occasionally sets heavily on shore. The

extremity of Shark Point and its projecting shoal have evidently extended since I saw them in 1845. It is, moreover, an universal rule on the south coast of Africa for headlands or rivers to have a spit or reef off their southern or left bank; but the majority, no doubt, owe the sandbank to the continual action of the South African current.

Second.—That on the right bank, or rather off Red Point, there are a number of holes in the sea-bottom, which, I imagine, are produced from the tearing away of the soil by the violence of the current, as it is there it flows with greatest force and frequency.

2. *On the Quilimane and Zambesi Rivers.* From the Journal of the late Capt. HYDE PARKER, R.N., H. M. Brig 'Pantaloön.'

Communicated by Captain J. WASHINGTON, R.N., F.R.G.S.

THE Luabo is the main outlet of the Great Zambesi. In the rainy season—January and February principally—the whole country is overflowed, and the water escapes by the different rivers as far up as Quilimane; but in the dry season neither Quilimane nor Olinda communicates with it. The position of the river is rather incorrect in the Admiralty chart, being 6 miles too much to the southward and also considerably to the westward. Indeed, the coast from here up to Tongamiara seems too far to the westward. The entrance to the Luabo River is about 2 miles broad, and is easily distinguishable, when abreast of it, by a bluff (if I may so term it) of high straight trees, very close together, on the western side of the entrance. The bar may be said to be formed by two series of sandbanks,—that running from the eastern point runs diagonally across the entrance and nearly across it. Its western extremity is about 2 miles outside the west point.

The bank running out from the west point projects to the southward $3\frac{1}{2}$ miles, passing not one quarter of a mile from the eastern or cross bank. This narrow passage is the *bar passage*. It breaks completely across at low water, except under very extraordinary circumstances. At this time—low-water—a great portion of the banks are uncovered; in some places they are 7 or 8 feet above water.

On these banks there is a break at all times, but in fine weather, at high water, a boat may cross near the east point. There is very little water, and, in places, a nasty race and bubble, so that caution is requisite. The best directions for going in over the regular bar-passage, according to my experience, are as follows: Steer down

well to the eastward of the bar-passage, so as to avoid the outer part of the western shoals, on which there is usually a bad sea. When you get near the *cross-bar*, keep along it till the bluff of trees on the west side of the entrance bears N.E.; you may then steer straight for it. This will clear the end of the *cross-bar*, and, directly you are within that, the water is smooth. The worst sea is generally just without the bar-passage.

Within the points the river widens at first and then contracts again. About 3 miles from the Tree Bluff is an island; the passage up the river is the right hand side of it, and deep. The plan will best explain it. The rise and fall of the tide at the entrance of the river being at springs 20 feet, any vessel can get in at that time, but, with all these conveniences for traffic, there is none here at present. The water in the river is fresh down to the bar with the ebb-tide, and in the rainy season it is fresh at the surface quite outside. In the rainy season, at the full and change of the moon, the Zambesi frequently overflows its banks, making the country for an immense distance one great lake, with only a few small eminences above the water. On the banks of the river the huts are built on piles, and at these times the communication is only in canoes; but the waters do not remain up more than three or four days at a time. The first village is about 8 miles up the river, on the western bank, and is opposite to another branch of the river called "*Muselo*," which discharges itself into the sea about 5 miles to the eastward.

This village is very extensive, and about it there is a very large quantity of land in cultivation; calavances, or beans, of different sorts, rice, and pumpkins, are the principal things. I saw also about here some wild cotton, apparently of very good quality, but none is cultivated. The land is so fertile as to produce almost any without much trouble.

At this village is a very large house, mud-built, with a courtyard. I believe it to have been used as a barracoon for slaves, several large cargoes having been exported from this river. I proceeded up the river as far as its junction with the Quilimane river, called "*Boca do Rio*," by my computation between 70 and 80 miles from the entrance. The influence of the tides is felt about 25 or 30 miles up the river. Above that the stream, in the dry season, runs from $1\frac{1}{2}$ to $2\frac{1}{2}$ miles an hour, but in the rains much stronger. The banks of the river, for the first 30 miles, are generally thickly clothed with trees, with occasional open glades. There are many huts and villages on both sides, and a great deal of cultivation. At one village, about 17 miles up on the eastern bank, and distinguished by being surrounded by an immense number of bananas

and plantain trees, a great quantity of excellent peas are cultivated, also cabbages, tomatoes, onions, &c. Above this there are not many inhabitants on the left or west bank, although it is much the finest country, being higher and abounding in cocoa-nut palms; the eastern bank being sandy and barren. The reason is, that some years back the Lanelines, or Caffres, ravaged all this country, killing the men and taking the women as slaves, but they have never crossed the river; hence the natives are afraid to settle on the west bank, and the Portuguese owners of the different "prazos" have virtually lost them. The banks of the river continue mostly sandy, with few trees, except some cocoa-nut palms, until the southern end of the large P. of Nyangué, formed by the river about 20 miles from Maruru. Here the country is more populous and better cultivated, the natives a finer race, and the huts larger and better constructed. Maruru belongs to Señor Aseredo, of Quilimane, well known to all English officers on the east coast for his hospitality.

The climate here is much cooler than nearer the sea, and Aseredo has successfully cultivated most European as well as tropical vegetables. The sugar-cane thrives, as also coffee and cotton, and indigo also is a weed. Cattle here are beautiful, and some of them might show with credit in England. The natives are intelligent, and under a good government this fine country might become very valuable. Three miles from Maruru is Mesan, a very pretty village among palm and mango trees. There is here a good house belonging to a Señor Ferrão; close by is the canal of communication between the Quilimane and Zambesi rivers, which in the rainy season is navigable. I visited it in the month of October, which is about the driest time of the year; it was then a dry canal, about 30 or 40 yards wide, overgrown with trees and grass, and, at the bottom, at least 16 or 17 feet above the level of the Zambesi, which was running beneath. In the rains, by the marks I saw, the entrance rise of the river must be very nearly 30 feet, and the volume of water discharged by it enormous.

Above Maruru the country begins to become more hilly, and the high mountains of Boruru are in sight; the first view of these is obtained below Nyangué, and they must be of considerable height, as from them they are distant above 40 miles. They are reported to contain great mineral wealth; gold and copper being found in the range, as also *coal*. The natives are a bold, independent race, who do not acknowledge the Portuguese authority, and even make them pay for leave to pass unmolested. Throughout the whole course of the river, hippopotami were very abundant, and at one village, a chase by the natives was witnessed. They harpoon the

animal with a barbed lance, to which is attached, by a cord 3 or 4 fathoms long, an inflated bladder. The natives follow in their canoes, and look out to fix more harpoons as the animal rises to blow, and, when exhausted, despatch him with their lances. It is, in fact, nearly similar to a whale-hunt. Elephants and lions are also abundant on the western side; the latter destroy many of the blacks annually, and are much feared by them. Alligators are said to be numerous, but I did not see any.

The voyage up to Maruru occupied seven days, as I did not work the men at the oar, but it might be done in four; we returned to the bar in two and a half days.

There is another mouth of the Zambesi, 7 miles to the westward of Luabo, which was visited by the 'Castor's' pinnace; and I was assured by Lieut. Hoskins that the bar was better than the one I visited.

The PRESIDENT, in inviting discussion on the subject of these papers, referred especially to Dr. Campbell's communication, which, he said, was replete with interest in geological and geographical points of view.

Dr. LIVINGSTON pointed out on the chart various rivers that he crossed in the district of the Congo, which, he said, flowed generally towards the centre of the country, and then turned away to the north. When he came to the Quango, he found it running due north, and the Portuguese whom he met, who had been making inquiries amongst the natives, told him that they believed it to form with the Kasai, the Congo or Zaire. He understood from some officers he met at Loando, that there was an immense body of water, discharging itself into the sea; he thought it might be possible to navigate the Kasai or Loke down to the sea, and on his return he had intended to go some distance down the river, to ascertain that point. When he came to Cabango, he met some people who came from a town under a chief called Mai, and they informed him that at that town there was a large waterfall on the river, and that after it passed the waterfall, the river joined the Quango. The Kasai was much the largest river, and when it joined the Quango it became the Zaire. He asked one of the men to imagine himself standing in the town of Mai, and to point out the confluence of the Kasai and the Quango. The man pointed west, and said, "Five days in that direction, the Quango and Kasai join together and form the Zaire." He also said he believed there was another branch coming from the north. If persons did not believe the accounts of these natives, it would be well if they would go and examine for themselves. With regard to the Zambesi, he came down that river at a different time of the year from that at which Captain Parker went up to the beginning of the delta—the point at which he, Dr. Livingston, left it, being severely attacked by fever. Having traced on the chart the course of the Zambesi and the Quilimane river and their slight connection with each other, Dr. Livingston said, he was informed by the Portuguese, that Captain Parker had come to the end of the delta, and was delighted with the appearance of the river up to that point. The mountains mentioned by Captain Parker were those opposite Sena. They formed a very high range, about 8 or 10 miles long, and at the top was a hot, sulphureous fountain. The people who lived on the mountain had been fighting with the Portuguese; hence the latter declined to accompany him there. On the opposite side there was a very high mountain to be seen in the distance, called the Gorongozo, with certain in-

scriptions on its top. It was famed for its salubrity and the purity of its waters, and the Jesuits, accordingly, had a settlement there. Below that point the river was capable of bearing a very large vessel, but as he had only seen it at its height, he could not be supposed to know its capabilities at any other time of the year. He had lately received a note from Lieutenant Hoskins, who served under Captain Parker, and this gentleman stated that he perfectly agreed with what he, Dr. Livingston, said in reference to the Quilimane river not being the Zambesi at all :—

“The Zambesi appears to have five principal mouths, of which the Luabo is the most southern and most navigable; Cumana, and two whose names I do not know, not having myself visited it, lying between it and the Quilimane, and the rise and fall at spring-tides on the bar of the Luabo is 22 feet; and, as in the passage, there is NEVER less than 4 feet (I having crossed it at dead low-water—springs), this would give an average depth sufficient for any commercial purposes. The rise and fall is 6 feet greater, the passages narrower and more defined, consequently deeper and more easily found than that of the Quilimane river. The river above the bar is very tortuous, but deep; and it is observable that the influence of the tide is felt much higher in this branch than in the others; for whereas in the Catinna and Cumana I have obtained drinkable water a very short distance from the mouth, in the Luabo I have ascended 70 miles without finding the saltness perceptibly diminished. This would facilitate navigation, and I have no hesitation in saying that little difficulty would be experienced in conveying a steam-vessel of the size and capabilities of the gunboat I lately commanded as high as the branching off of the Quilimane river, which, in the dry season, is observed many yards above the Luabo; though I have been told by the Portuguese that the freshes which come down in December and March fill it temporarily. These freshes deepen the river considerably at that time of the year, and freshen the water many miles from the coast. The population of the delta, except in the immediate neighbourhood of the Portuguese, appeared to be very sparse. Antelope and hippopotami, the former tame and easily shot. I inquired frequently of both natives and Portuguese if slavers were in the habit of watering there to ship their cargoes, but could not ascertain that they have ever done so in any except the Quilimane. With common precaution the rivers are not unhealthy; for, during the whole time I was employed in them (off and on during eighteen months), in open boats and at all times of the year, frequently absent from the ship for a month or six weeks at a time, I had not, in my boat's crew of 14 men, more than two, and those mild, cases of fever. Too much importance cannot be ascribed to the use of quinine, to which I attribute our comparative immunity, and with which our judicious commander, Commodore Wyvill, kept us amply supplied. I hope these few remarks may be of some little use in confirming your views of the utility of that magnificent river.

“A. H. H. HOSKINS.”

It appeared to him, Dr. Livingston, from all the information he could obtain, that this branch of the Zambesi was navigable for ships of some burden, provided they entered at spring tides, but he should not recommend a gunboat to be sent up the river. Although a large vessel might go up without any difficulty, as far as Tete, for some months when the river was full, it would be advisable, in any attempt to ascertain its navigability, to send a vessel of the very lightest draught, otherwise it might get stuck on some bank in a very unhealthy part of the river, and the whole attempt might be frustrated by disease.

In answer to an inquiry from Mr. Galton, Dr. Livingston stated that there were no obstructions in the river lower down than 20 miles above

Tete. There are many reedy islands, but open spaces between them, in which the deep channel is always found. At a range of mountains called Lopata, the river was narrowed, but very deep, and it was at least 300 yards broad at the narrowest part. Twenty miles above Tete, there was a rapid, which he, unfortunately, did not see, as he was obliged to leave the course of the river at that part, in consequence of numerous rivulets which, filling with the rising river, interfered with his progress. The rapids consisted of a number of rocks, jutting out of the stream, which were very dangerous when the water was low. Higher up, was a crack or fissure made through a high ridge of land for about 30 miles, through which the river ran, forming the most wonderful sight he had ever seen. He thought the fissure must have prevented the Portuguese of old from going up by way of the river, and he believed they never went into the valley in that neighbourhood, which should be regarded as an English discovery. On an island there, called Kalai, he saw the grave of a chief with 70 elephants' tusks planted round it, rotting in the sun and rain, and 30 tusks on the graves of his relatives; and all through the country elephants' tusks were similarly used as gravestones—a use to which he believed they would not have been applied, even in the case of the chief, if they could have found a market for them. It was the same as at Lake Ngami, where the tusks were allowed to rot for want of a market. A trader who accompanied him on the occasion of the discovery of the lake, purchased 10 tusks for a musket worth 15s. A market having been established, the tusks would no longer be allowed to rot; in fact, so fond were these people of traffic, that he believed they would rob their fathers' graves, if they could get a penny by it. Wax, also, was often thrown away, because no market was found for it. As soon as the opportunity of selling it presented itself, there could be no doubt that the natives would collect and dispose of it as they did in the west. One great object which he proposed to himself in going back, was to endeavour to make the Zambesi a permanent path for commerce. He had no doubt that if the people on both sides found there was a certainty of getting their goods purchased, they would cultivate and collect the produce of the country most willingly, for one remarkable feature in African tribes was their great desire for barter. He often found great difficulty in passing through some of their villages, the natives trying to stop him and his party, so that they might remain long enough to be compelled to buy their supper. If they only remained to supper, they could get off pleasantly enough the next morning. Several Englishmen and Frenchmen had formerly asked for liberty to go up the Zambesi, but they had been always refused permission to ascend. We had been guilty of that sort of dog in the manger policy ourselves, and were not therefore in a position to look down upon the Portuguese for acting in the same manner. He had been told, however, that they had lately made all the ports on the east coast of Africa perfectly free to commerce.

MR. J. CRAWFURD, F.R.G.S., asked the distance from the mouth of the Luabo to the fissure described by Dr. Livingston?

DR. LIVINGSTON replied that the distance was between four and five hundred miles by way of the river.

MR. CRAWFURD.—And do you consider the river navigable for four or five hundred miles?

DR. LIVINGSTON.—With the exception of those first rapids. It is nearly 300 miles up to the first rapid, and the fissure is 150 miles past that.

MR. CRAWFURD said if the river was navigable, he could not understand how the Portuguese, who were so close to it, should have always preferred the Quilimane. They had been in the neighbourhood almost from the time of Vasco de Gama, and he could not conceive how they could have been so absolutely stupid as not to have discovered that there was a superior branch of the river close to them. But if the river really was navigable to the extent

of 300 miles, what advantage would a vessel get by going there? None, so far as he could see. Was there any shelter or harbour for its protection? The district was within the sphere of the monsoons, and there must be occasional typhoons or hurricanes; evidently no trading could be carried on. He never knew people so stupid and backward as not to know what to make of their wax and honey. The Portuguese, being close at hand, ought to have a market for their ivory and beeswax. It was mentioned in Captain Parker's paper, that cocoanuts abounded at the junction of the two rivers: that, however, was by no means a proof of fertility, but the reverse; it was an evidence that the spot was near the sea, and the coconut thrived generally in a very poor soil, in mere sand. Captain Parker stated also that there was wild indigo; but he should like to know of what kind. There was wild indigo in almost every tropical country in abundance, but the great thing was to cultivate it and manufacture it skilfully. It was a long time before the Hindoos, who had manufactured indigo for two or three thousand years, could compete with the article brought from South America. That did not happen until the process introduced from the West Indies was superintended by Europeans. It would require land of the greatest fertility, and a peaceable and well-established government, capital, and European skill, to enable the Africans to grow a pound of good indigo.

CAPTAIN NOLLOTH, R.N., in reply to Mr. Crawford, said there was no shelter or harbour at the entrance of the river; but that was no reason why ships might not visit it, if the river was navigable. It was not safe, however, for a large vessel to anchor within seven or eight miles from the mouth of the river, on account of the heaps of sand.

The PRESIDENT.—Do you suppose that if smaller vessels were employed to go up the river, larger vessels could anchor in the neighbourhood with safety?

CAPTAIN NOLLOTH.—I have anchored there with safety.

The PRESIDENT.—And there was no dangerous wind blowing on shore?

CAPTAIN NOLLOTH.—None.

DR. LIVINGSTON said 'The Grecian' had visited the Luabo in 1853, and the master thought that a vessel of considerable size could easily go in there, and be completely land-locked and out of observation. He said also that a short time before, he believed a brig under American colours came in and shipped slaves at that port. He (Dr. Livingston) had a drawing from a Portuguese pilot, who told him that there was a good harbour. It was certain that there was an immense body of water flowing into the sea, and naval officers who had gone there declared that it was fit for commercial purposes. Mr. Crawford had asked what a ship could get by going up the river. The same question might have been put in 1849 to Mr. Oswell and himself, when they went to Ngami. Neither Mr. Oswell nor himself picked up a single tusk of ivory, there being fortunately a difference of tastes in the world; but a trader who went with them, filled his waggon with ivory, and made a good thing of it. He asked some Portuguese at Quilimane, how it was they were so stupid as to build the capital of Sena at a place which had no connection with the river of Sena, the Zambesi; and they stated that when Quilimane was founded, the river flowed that way, but that it was now filled up. Quilimane was not a place that any man in his senses would ever think of settling at, except for the advantages of trade. It was built on a great mudbank, with mangrove bushes on both sides of the river, and if you dug down two feet you came to water. The walls, which were made of brick, often sank in, so that the bottoms of the doors had to be cut off, the floors not sinking to the same extent.

The indigo exported from the district in question was said to be very good, and also from Natal, pieces of the same plant had been shown in this country;

having the peculiar copper mark, which the best indigo was said to possess. Whatever its character however might be, it certainly dyed blue, and some of the natives called it the "changer." He did not hold out any great expectations of much gain to be realised immediately. He did not suppose that a great trade would spring up at once, but he had such confidence in the resources of the country, that he intended to devote a portion of his life to their development. If legitimate commerce could be established in that large tract of country, it would be the best means of putting a stop to the slave-trade.

MAJOR VARDON, F.R.G.S., said it would appear from statements that had been made, that the hippopotamus was very easily speared; but he had always been under the contrary impression.

CAPTAIN NOLLOTH explained that where vessels had got over the bar, to which allusion had been made, they could ride in perfect safety inside.

Tenth Meeting, March 23, 1857.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS.—*Capt. W. J. Eastwick, of the Bombay Army; Lieut. J. H. Glover, R.N.; and W. B. Greenfield, Esq., were officially introduced upon their election.*

ELECTIONS.—*T. W. Bramston, Esq., M.P.; Dr. James Campbell, R.N.; Major-General W. G. Moore; the Earl of Munster; Captain Laurence Trent Cave; and William Reed; George R. Smith; Robert Sweeting; and John Vincent, Esqrs., were elected Fellows.*

DONATIONS.—Among the donations since the former Meeting, were—Map of the country of Cape May, State of New Jersey, U.S., presented by E. L. Viele, Esq.; Geometrical Projection of two-thirds of a Sphere, by Colonel James, R.E.; Transactions of the Madras Literary Society; the Bengal Asiatic Society; the Franklin Institute of Pennsylvania, etc.

ANNOUNCEMENTS.—In opening the business of the Meeting, the President announced the receipt of a letter from the eminent Prussian geographer, Carl Ritter, in answer to an anxious inquiry of his own respecting the health of his illustrious friend, Baron Humboldt; and he was truly happy to state that that great man had completely recovered from a momentary attack which had not in the slightest degree impaired his brilliant mind, the continued application of which was of such vast importance to the progress of science. He was happy to see how truly the merits of Dr. Livingston were appreciated by so competent a judge as M. Ritter, who speaks of our countryman as one of the noblest and greatest characters the black race has ever seen.

The PRESIDENT next stated that the Astronomical Observations by

Dr. Vogel and Corporal Maguire, in Central Africa, had been received from the Foreign Office, through the kindness of the Earl of Clarendon; also a copy of a Despatch from Her Majesty's Consul at Tripoli, enclosing a copy of a letter from Corporal Maguire, dated Kuka, November, 1856, announcing the reported assassination of Dr. Vogel at Wadai. Sir Roderick remarked that this was a mere report, and cautioned the members against placing much faith in it, reminding them that similar statements had gained circulation of the death of several other African travellers, who had afterwards, and as he hoped would be the case with Dr. Vogel, returned to this country alive and well.

In quitting the subject of Africa, he had farther to announce that the renewed maritime expedition to the Niger, as advocated by the Society, would soon quit our shores, commanded by the same competent observer and naturalist, Dr. Baikie, F.R.G.S., who had formerly succeeded so well; and he had great pleasure in recording the praiseworthy and efficient manner in which the Earl of Clarendon had again countenanced this important national enterprise.

Sir Roderick then stated that he had received a communication from Sir J. Herschel, enclosing a portion of a letter from Mr. Maclear, Her Majesty's Astronomer at the Cape, in which he remarks that "Dr. Livingston's observations had been reduced and sent to England. The exploit of crossing the African continent from west to east, and of perseveringly fixing, by astronomical observations, the interesting features of the path, combined in placing the poor missionary pre-eminently in the front rank of the most celebrated explorers."

In connection with this subject, the Chairman informed the Meeting that the Government of Portugal had sent out orders to Mozambique to support Dr. Livingston's late companions at the public expense of that province, until his return to claim them.

The Chairman next alluded to the energy displayed by Mr. H. Babbage, at the imminent risk of his life, in overcoming great difficulties when deserted and alone, and to the talent with which he had endeavoured to detect gold-bearing rocks in the vicinity of Lake Torrens, in Australia, and in tracts unknown to Europeans.*

Lastly, he had the satisfaction to state that the expedition under Mr. Palliser would proceed in a fortnight to its starting point on Lake Superior, with the view of surveying vast tracts of British North America, as yet most imperfectly known, particularly the country watered by the affluents of the Saskatchewan, and with the

* See 'Adelaide Observer,' Nov. 22, 1856.

ulterior view of examining the southern portion of the Rocky Mountains in our territories, and possibly of discovering a new practicable passage through them, to Vancouver Island.

He farther stated that Dr. Hector had, on his recommendation, been appointed the geologist, naturalist, and medical man to the expedition, whilst Lieut. Blakiston, R.A., F.R.G.S., was to make magnetical observations, as instructed by General Sabine, and the botanical collection as recommended by Sir W. Hooker and Dr. Hooker.

Under these circumstances, the President hoped that an expedition which had originated in the recommendation of the Council of the Royal Geographical Society to Her Majesty's Government, would be very efficiently and successfully completed under the direction of the Colonial Office, and especially of Mr. John Ball, the Under-Secretary, who had undertaken the task with such zeal and knowledge of the subject.

The Rev. C. G. NICOLAY, F.R.G.S., understood that one summer was to be spent in examining the district between Lake Superior and Lake Winnipeg. With due deference to those who had made this alteration in the original plan of the expedition, he thought this would be a mere waste of time. Amid such a network of waters as lay between these two lakes, nothing definite could be done in one summer, and the route itself was already sufficiently well known through the officers of the Hudson's Bay Company and others. He also understood that the first winter was to be spent at Fort Charlton, which was several hundred miles out of the line originally recommended by the Society to be explored. Before the expedition started, he really hoped the instructions would be reconsidered. The great object should be to press across the plains to the south of the Saskatchewan, and get to the Rocky Mountains as soon as possible.

The PRESIDENT said Mr. Nicolay had really expressed his own opinions and the opinions of the Council of the Society. The Government, however, appeared to have other objects in view besides mere geographical discovery; he hoped, therefore, that Mr. Nicolay would not press the subject farther at present.

The papers read were :—

1. *Notes of a Journey eastwards from Shiraz to Fessa and Darab, and thence westwards by Jehrûm to Kazeran in 1850.* By Mr. Consul KEITH E. ABBOTT.

Communicated by the Earl of CLARENDON.

[This paper will be printed in full in the Journal.]

GENERAL MONTEITH, F.R.G.S., said it was a considerable number of years since he visited this country. He was directed to survey the Passes from Bushir to Shiraz and the plain of Kazeran; and the route was so minutely surveyed that he thought there was no geographical feature that remained to be ascertained. Kazeran he considered a great military point, as it commanded the entrances of the valleys. It was a beautiful region, well watered, and, if cultivated, would be highly productive. He saw there the largest orange-tree he had ever met with, it being 40 feet in height. From Kazeran commenced the most difficult

passes. About nine miles from Shiraz was the pass called the Virgin's Pass, which was, in fact, a flight of steps, protected by a very low parapet wall, yet exceedingly dangerous to pass. It was constructed at the private expense of a merchant, who said he had lost more of his mules in one year than the road cost. To the right of it a good road, however, might be made, without great difficulty, as it was but two miles over, altogether. From this point the route descended into a fine wooded valley, and proceeded along till it reached the Old Woman's Pass, which was about four miles in length. This pass was neither so steep nor so rocky as the other. Beyond this came a succession of well-watered and well-cultivated valleys. The cultivation of the plain of Shiraz itself was limited, owing to the want of water, as the small stream which passed the town was used to water the gardens and fields in the vicinity. Sculptured rocks of the kind alluded to by Mr. Abbott, were to be found in every part of the province. At Kazeran there is a stalactite cave, 100 feet deep, and at the bottom there was a statue which had been thrown down, and the water which formed the stalactite had attached it to the bottom of the cave.

2. *Proposed Search for Dr. Leichhardt's Missing Party.* By SAMUEL SIDNEY, Esq.—(Author of 'The Three Colonies of Australia').

MR. SIDNEY said the paper had been transmitted to him from Australia, by one of the squatters in the most northern district of the province of New South Wales, who had resided fourteen years in the wildest part of the colony, who had himself conducted exploring expeditions in search of "Runs," into districts never before trodden by white men, and who therefore was entitled to speak with all the authority of experience on the subject of the evening—the probable fate of Dr. Leichhardt. The last intelligence received of Leichhardt was contained in a letter dated Cogoon, April, 1848. At that time he expected to reach Swan River, in about three years. The great length of time which had elapsed since Leichhardt's departure, was no proof of his death, because if supported by hunting, which he must be, he could only proceed at the rate of three or four miles a day, and would not leave any place where game was plentiful, as there are many in the oases of the interior. Dr. Leichhardt had, on former occasions, lived on friendly terms with the aborigines and been fed by them, when they were at the same time at war with neighbouring stockowners. The northern Bushmen do not believe the story brought by Mr. Hovenden Hely, that Leichhardt was murdered on a creek 150 miles from Wandaigumbal, on the Condamine. They say that the remains of pack saddles, found by Mr. Hely, were not those of Leichhardt's party, but of two squatters, who were lost in the Bush. They observe that although it is well known that cattle will return 600 miles to their homes, especially if attacked and dispersed by blacks, not one of Leichhardt's large lot has ever been seen—a positive proof that he had penetrated too far for them to return.

They maintain that the route which Leichhardt took on his last expedition, was in all probability on Sir Thomas Mitchell's track, as far as that officer reached to the North. From thence, in his attempt to proceed westward, he was too practical a Bushman to attempt a desert so fearfully illustrated by Sturt; that he would be sure to follow on one side of the coast range or backbone of the colony, to make sure of water and the greatest probability of food;—that he probably reached the longitude of Port Essington, and in endeavouring to push on south-west from thence, has got into some difficulty—perhaps depending on some friendly tribe for food. The south-west being in all probability badly watered, no prudent man would attempt to cross it, except in a wet season, and therefore Leichhardt might be stuck fast with a desert between him and water, waiting for a wet season to travel. That the wild blacks, less ferocious than those on the borders of the pastoral districts, would be likely to retain him among them as a curiosity or deity;—or that he may be gradually winding his way back, hunting for food, at the rate of three or four miles a day;—that therefore if it took him three years to reach the spot where he had to turn back, it would take double that period to return to the point of his departure.

Mr. Sidney's correspondent concludes by suggesting an Expedition in search of Leichhardt, which has been planned by practical northern Bushmen. It should consist of fifteen disciplined aboriginal troopers of the native police force, under the command of Frederick Walker, the late Commandant of that force, who had volunteered to serve without pay or remuneration of any kind, with 60 horses, 45 of which to be laden with supplies—meat rations to be obtained by the hunting blacks. The expedition should start from the farthest station in the Port Curtis district, and get upon Leichhardt's tracks, which would be plain for twelve or fourteen years in a country unoccupied by cattle. As Leichhardt always marked trees at his camp, and his cattle would travel in single file and denote his route, the black troopers would follow these like blood-hounds, and infallibly find Leichhardt's party or bring back his papers, the brands of his cattle, or other complete solution of the mystery that now hung over his fate.

The expedition should be met by a coasting vessel at some convenient point, and provided with supplies for a second year.

Mr. Sidney concluded by observing that nothing was to be expected from the Home Government; or from the New South Wales or Sydney citizens, with whom explorers and exploring expeditions were alike unpopular. It rested with men of science and wealth to subscribe the three or four thousand pounds needful for ascertaining

the fate of, and perhaps rescuing, the man who had sacrificed everything to the cause of geographical science.

3. *Return of the North Australian Expedition*, under Mr. A. C. GREGORY.

Communicated by G. F. LESLIE, Esq., F.R.G.S.

Burnett District, 2nd December, 1856.

SIR,—I have the honour to inform you of the arrival of the North Australian Expedition within the limits of the settled parts of New South Wales, and transmit for the information of his Excellency the Governor-General a brief outline of the proceedings of the expedition.

From the time of landing the horses at Point Pearce in September, 1855, to the 9th May, 1856, the party was employed in preliminary details, and the exploration of the country to the south of the Victoria River, having penetrated the interior deserts to latitude $18^{\circ} 20'$ south, and longitude $127^{\circ} 30'$ east; a detail of which I forwarded by the 'Tom Tough' schooner, viâ Copang, and which doubtless has already come to hand.

The schooner 'Tom Tough' having been seriously damaged in ascending the Victoria River, and a quantity of stores and provisions thereby destroyed, I instructed Mr. Baines to embark that portion of the expedition which was not required to form the land party, and to proceed to Copang for supplies, and thence to the Albert River in the Gulf of Carpentaria, to co-operate with the land expedition.

On the 21st June I left the encampment on the Victoria River, with a party of six persons, viz., Mr. H. Gregory, Mr. Elsey, Dr. Müller, and three men—Dean, Bowman, and Melville.

The arid nature of the country in the interior of Northern Australia compelled us to increase our latitude to 15° S. in order to pass the central parts of Arnheim-land, after which we kept parallel to the coast as far inland as water could be found in the rivers, the greatest distance from the sea not exceeding 100 miles.

Reaching the appointed rendezvous at the Albert River on the 30th August, the schooner had not arrived, and from some marked trees, it appeared that Her Majesty's Ship 'Torch' had sent a boat up the River a few weeks previous, but it was evident that this visit had no reference to the expedition, as the only marks left consisted of the names of some of the crew, which they had amused themselves by carving on the trees and stumps; and the ashes of their fire.

Under these circumstances, I deemed it not advisable to wait the

arrival of the schooner, and having marked trees, and buried instructions for Mr. Baines at a spot which had been previously agreed upon, we left the Albert on the 3rd September, and made some ineffectual attempts to proceed to the south-east, but want of water compelled me to pursue a route parallel to the coast to latitude 17°20 S., when the Gilbert River enabled a S.E. course to be again pursued.

Crossing the Heads of the Lynd in 18°40, we reached the Burdekin on the 16th October. Our route was then along the right bank of that river to the junction of the Suttor River, which was followed up to the Belyando River. Tracing that river to latitude 22°, we then pursued a south-east course to the junction of the Comet and Mackenzie Rivers, and thence our course to the Dawson brought us to Messrs. Connor and Pitt's station, on the 22nd November.

I am now en route to Brisbane, where I purpose to leave the horses until arrangements can be made for their disposal, and proceed direct to Sydney.

(Signed)

A. C. GREGORY,

Commander N. A. Expedition.

To His Excellency the Governor-General.

The PRESIDENT remarked that this was but an outline sketch of the journey; doubtless a much more detailed account would be shortly received.

LIEUT. CHIMMO, R.N., F.R.G.S., said no person could take a greater interest in the paper than himself, as he was sent out in the 'Torch' to leave supplies for Mr. Gregory and his party. But there was one portion of it which he could not allow to pass unnoticed, as it appeared to reflect on the arrangements made by him for the search of that party. Mr. Gregory stated that although he found marks and indications of a party having been in the Albert River, yet he could not ascertain that they came there in search of him. Mr. Gregory's visit must have been rather short, or he would have discovered some of the numerous indications that were left for his guidance. One whole evening—and the evenings were rather long in Australia—two boats' crews were employed cutting marks on trees, hanging up bottles with notices in them on different branches, and one man climbed a cocoanut-tree, the only cocoanut-tree on the river, 63 feet high, and hung a bottle in a conspicuous place. He did not regret that Mr. Gregory's visit was short, because, as it was about the change of the monsoon, his people might have suffered from the serious effects of the climate at that period, on the uninviting and barren shores of Northern Australia.

MR. ROBERT WOOD said he should be exceedingly sorry to say one word that could discourage the interesting endeavour to search for the remains of Dr. Leichhardt. But the accidental circumstance of the Doctor having paid him a short visit at his house at Belmaine, near Sydney, a very few days before starting on the expedition, had put him in possession of Dr. Leichhardt's intentions as to the route he proposed to follow. That route differed materially from the one suggested in Mr. Sidney's paper, and he, therefore, thought it his duty to lay it before the Society. He conceived it necessary to do so, because

he believed that Dr. Leichhardt would under all circumstances follow out this route. He assigned as a special reason for doing so, that it would probably bring him to a tangent with the route formerly taken by Captain Sturt from the southern coast, and he expected to intersect that line at almost right angles by crossing from the east to the west of the continent of Australia. He proposed to start from Moreton Bay, and to diverge slightly to the northwards in penetrating the interior; then, after reaching Sturt's line, to go on to Perth on the west coast. He was accompanied by Mr. Lynd, whose name had been given to one of the rivers on the east coast.

The PRESIDENT asked Mr. Wood whether it was his opinion that, in adventuring westward, Dr. Leichhardt had got lost in some of the saline deserts in the interior?

MR. WOOD was sorry to say that this was his opinion.

MR. HAUG said that the deep interest which he took in the fate of Dr. Leichhardt gave rise to the project which he had the honour to lay before the Council three years ago. If Leichhardt had crossed the track of Sturt, or even advanced more into the interior, it might have been supposed that Mr. Gregory would have come upon some indications of the direction taken by Dr. Leichhardt. Still Mr. Gregory had not mentioned having heard from the natives anything about Dr. Leichhardt. All who cherished geographical enterprise would feel indebted to Mr. Sidney for the plan he had proposed, and he hoped the Council would not be wanting in starting a new expedition for the purpose of discovering something more of the fate of Dr. Leichhardt.

MR. P. L. SIMMONDS observed that he had, during some years past, paid attention to this subject. He well remembered that, in his first expedition, Dr. Leichhardt was given up; and, as in the case of African travellers, he was a little sceptical about the fate of Leichhardt, until more satisfactory proof of his fate had been obtained. Supposing that he did make his way to the westward in the direction he intended, circumstances might have occurred to cause him to diverge in some degree to the northward or the southward of the proposed line of route. Travellers could not always adhere to the plan they laid down for themselves. With regard to the interior of Australia, the means of support were not so hopeless as was supposed, for it was well known that the aborigines lived on a variety of things produced by the soil. He was glad to see the subject revived, and he could only hope that the Society would not let it drop, without an effort to obtain some definite information as to the fate of the missing party. Taking into consideration the vast extent of Australia, and the slow progress that the party must make, having to find their own sustenance, he did not think the time which had elapsed since the expedition started, should lead to the conclusion that Leichhardt was hopelessly lost.

MR. W. J. HAMILTON, F.R.G.S., rose with considerable reluctance, but having taken a very great interest in the progress of Dr. Leichhardt, and believing that it was now almost hopeless to expect any satisfactory result from the exploration proposed, he should wish—although most unwilling to throw cold water upon any expedition likely to prove useful—before the Society was led away by the hopeful expectations thrown out by Mr. Sidney, to ask a few questions. In the first place, it had always been understood that Dr. Leichhardt would proceed almost in a due west direction from the parallel of Sydney or Moreton Bay. With regard to that point he should like to ask Mr. Sidney where was the point at which the ship was to meet the expedition after one year had elapsed? Next, he wished to know, how it was proposed that the parties composing the expedition, should carry provisions for themselves and fodder for the horses through those arid districts, which constituted the principal feature of the interior? The nature of the country had been sufficiently ascertained to lead to the conviction that, without carrying a very large supply of provisions, both for the men and for the beasts, which would form the staple

of this expedition, it would be impossible to penetrate to any great distance through the sterile regions of Central Australia.

MR. SIDNEY said that they had just learned from Lieut. Chimmo, that Mr. Gregory had even missed the traces of the 'Torch' party, which preceded him a very short time. Therefore, they had very fair reason to conclude that many traces of Leichhardt would also have escaped him, and that up to the present time, no search had been made at all. With respect to the manner in which the proposed expedition should be conducted, he observed that the plan of proceeding was drawn up by gentlemen practically acquainted with the subject, and who were as great authorities on Australian travel, as Kit Carson and Col. Fremont were on travelling in America. As to the point on the coast where the ship ought to meet the party sent in search, it should be selected by the leader of the party. It would be better to leave that to him than to settle it here at home. The blacks, it was well known, could live upon lizards and grubs, and with a pound of flour to each man per day, there would be no difficulty with regard to the support of the party.

MR. GALTON, F.R.G.S.—“Having devoted considerable attention to what I have termed the ‘Art of Travel,’ I must beg to express my opinion that the arrangements which I have heard proposed this night for an expedition in search of Dr. Leichhardt, and towards the equipment of which the English public is asked to subscribe, do not appear to me to offer any probability of success. I am very willing to grant that the gentlemen who have planned this expedition, may personally be well-qualified explorers, but I cannot think otherwise than that they are far too sanguine and enthusiastic in their estimate of what might be accomplished by the means they propose. In the first instance, they expect to reach in six months a distance which they assume Dr. Leichhardt to have required three years to accomplish. This I think very unlikely. Again, it is proposed to take a caravan of some sixty horses—a number that I believe is very difficult for 15 men to manage efficiently in a broken country. Their estimate, moreover, only professes to allow 1 lb. of solid food (flour) per diem for each man. Human life cannot subsist on 1 lb. of flour per day. Those who are interested in this subject may consult with great advantage the excellent paper by Dr. Christison in the Appendix to the Report of the Crimean Commissioners, where questions of diet are thoroughly gone into and established on a positive basis. By the facts adduced in that paper, it will be seen that at least double the weight of solid food, that it is here proposed to carry, is absolutely essential. Lastly, it is assumed that the track of Dr. Leichhardt still remains so clearly defined, that the proposed party could follow it straight onwards without difficulty or delay. Such might possibly be the case in certain woodland districts, but across most sandy tracts, it is clear that the clue would be entirely broken, and that a pursuing party must, under these circumstances, be prepared to devote considerable time towards recovering it. They would be like hounds slowly hunting on a cold scent, and coming perpetually to fault, while, farther, it must be recollected, that questions of water and of fodder do not admit of prolonged and careful search in desert districts. For these reasons alone, and without entering deeper into the subject, it seems to me, as I said before, that the means proposed for following up the tracks of Dr. Leichhardt are entirely incommensurate with the difficulties of the case.”

MR. SIDNEY said that the black men of the party would pick up food by the way, and partly support themselves.

MR. GALTON.—They would not be able to pick up much sustenance, as they travelled quickly on through a desert.

MR. T. SAUNDERS, in reply to Lieut. Chimmo's assertion, that North Australia was arid, barren, and unfit for human habitation, quoted the opinions of Flinders, Stokes, and Leichhardt, to show that it was just the reverse. He then reviewed at some length the course of Mr. Gregory's expedition, and

maintained that, with reference to the Gulf of Carpentaria, and the south-eastern affluents of the Victoria River, he had failed in the objects entrusted to him. The only thing he had accomplished was to determine the north-west limits of the great desert, as Austin had the south-west limits, and Sturt had the south-east. Mr. Gregory might have waited on the Gulf for the arrival of his tender with supplies, and have employed his time in tracing some of the numerous rivers falling into it, from their mouths to their sources in the interior.

The PRESIDENT, in bringing the discussion to a close, said that Mr. Gregory appeared to have followed the instructions given to him by that most accomplished traveller, Captain Sturt. He had proceeded in two directions to ascertain whether the interior of the country was a saline desert or not. Having satisfied himself on that subject in two or three excursions to the southward, he proceeded to the northward, to mark, as far as it was possible, the nature of the affluents that fell into the Gulf of Carpentaria. Whether he had sufficiently examined them, it was not for the Society to judge until they had received the details of his journey. They all knew it was one of the most remarkable journeys ever performed in that great continent.

With respect to Dr. Leichhardt, he could not entertain hopes of his being found alive, because from all that could be learned, the interior was one vast saline desert; it was only the coast region that was capable of sustaining human life; and if Dr. Leichhardt went to the westward, he must have gone into the saline desert, and probably perished there with all his party.

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1857.

Eleventh Meeting, April 27th, 1857.

Sir RODERICK I. MURCHISON, PRESIDENT, in the Chair.

ELECTIONS.—*Major-General A. Alexander; Dr. Risdon Bennett; Major-General J. R. Craufurd; Rev. C. E. Ruck Keene; Sir George Simpson, Governor-in-Chief Rupert Land; the Rev. R. C. Trench, Dean of Westminster; and G. W. Allan; A. Asher Goldsmid; H. R. Grellet; Charles C. Hill; Richard Hoper; Austen H. Layard, D.C.L.; G. A. Lloyd; Andrew A. Paton; Edward Purcell, LL.D.; Thomas Vardon (Librarian of the House of Commons); and Charles Verrey, Esqrs., were elected Fellows.*

DONATIONS.—The donations to the Library since the former meeting were very numerous, among which the following more important ones were mentioned:—184 sheets of the Ordnance Survey, completing the county of Linlithgow; 21 sheets of the Indian Atlas; 194 charts and other geographical works, presented by the Hon. the East India Company; 5 additional maps of the Atlas of Bavaria, presented by the Surveyor-General's department in Bavaria; Reuss and Browne's Map of the Subdivision in and about Sydney and its Environs, in 4 sheets, presented by the authors; map of the United States, British and Central America, by Professor A. D. Rogers, of the United States, and A. Keith Johnston, F.R.G.S.; Nos. 9, 10, and 11 of the Royal Illustrated Atlas, by Messrs. Fullarton and Co., of Edinburgh; manuscript map of South-Eastern Africa, showing the Orange River Sovereignty, &c., by Mr. R. Moffatt, presented through Dr. Livingston; Memoirs of the Geological Survey of India, presented through Professor Oldham; Projections of Two-thirds of a Sphere, by Colonel James, R.E.; Dr. Armstrong's Discovery of the North-West Passage; maps of the Indian Archipelago and Chile, &c., by J. Bartholomew, Jun., F.R.G.S.; &c. &c.

ANNOUNCEMENTS.—The President announced that the subscription list in aid of the expedition in search of the Franklin relics, and

towards which 800*l.* had already been subscribed, would be shortly advertised. The Eighth Number of the Proceedings of the Society was laid on the table.

The Chairman then drew the attention of the meeting to the Chinese maps, presented by Consul Parkes, F.R.G.S.

The papers read were:—

1. *Memoir on the Neighbourhood of Canton and Hongkong, and the East Coast of China.* By Sir JOHN FRANCIS DAVIS, Bart., K.C.B., F.R.G.S.

As the seat of the late operations, and the most probable theatre of the future ones, in the existing dispute with China, it may perhaps be of some interest to take a general view of the neighbourhood of Canton and Hongkong, including the whole of the river as far up as the provincial capital of Kuang-tung province. All our troubles since the war (at least, all that have not admitted of a satisfactory arrangement) have been at Canton. Circumstances, which cannot be fully detailed here, have tended to promote both the ill-feeling and the arrogance of the Cantonese. At most of the new ports to the northward the power and the moderation of the British were equally demonstrated during the war, until the growing good feeling of the native population towards their invaders became one of the omens, at least, which induced the Imperial Government to hasten an accommodation with us. Canton, on the other hand, has escaped chastisement, and (as might have been foreseen) attributed this merciful forbearance to wrong motives;—a mistake which the experience of the North has not corrected, because the immense distances and the imperfect means of communicating knowledge (so inferior to our own in Europe) keep the different portions of that empire very much in the dark respecting each other.

A better proof of this almost incurable ignorance could not be adduced, than the account of the English received by M. Huc from a Tartar near Peking, one of a body who had been stationed at Tientsin, to oppose us in case we approached the capital. To the question, “*Vous êtes-vous battus? avez-vous vu l’ennemi?*” he replied, “*Non, il n’a pas osé paraître.*” Les Chinois nous répétaient partout que nous marchions à une mort certaine et inutile. ‘*Que ferez-vous,*’ nous disaient-ils, ‘*contre des monstres marins? Ils vivent dans l’eau comme des poissons; quand on s’y attend le moins, ils paraissent à la surface, et lancent des “si-koua”* enflammés. Aussitôt qu’on bande l’arc pour leur envoyer des flèches, ils se replongent dans l’eau comme des grenouilles.*’”

* Their name for bombshells.

It seems at once good policy as regards the Cantonese, and mere justice and humanity towards the better-disposed populations towards the north-east, that, if a lesson is to be administered, it should be administered in the right quarter. Topical evils require topical remedies: and if we were once more to leave Canton to itself (as we have done before), the question would again be asked, which was so often asked then,—“Why did you not address yourselves to those who had offended you, and were prepared to resist you, instead of attacking us?” At Canton, besides, there is nothing at present to lose, for all trade has left it, and all the foreign quarter is in ruins. The complete capture and occupation of the city and the heights behind by our troops, with Hongkong and its harbour, its barracks and its hospitals, for the base of operations, would at once dispel the delusions of the Cantonese, and supply us with a material guarantee and pledge, as long as it was retained, for all that we have to require from the Peking Government. These two points seem to comprise within themselves the objects of the expedition—that is to say, satisfaction for the past and security for the future; and, as the surest way to the second, the first seems indispensable—viz. the capture and occupation of the provincial city.

Apart from some peculiar disadvantages which conspire to render Canton about the worst place for our trade (a trade which was altogether forced there by the policy of the Tartar Government), that city happens to be placed on one of the finest and most commodious navigable rivers in the world. Some account of this river, and of the islands and principal anchorages in its neighbourhood, with the several points of defence, may be interesting at a time when the public prints contain accounts of naval transactions, and of movements from one place to another whose names and localities are to many unknown.

The whole distance between Canton on the N.W., and Hongkong on the S.E., is about 77 nautical miles, of which 45 extend from Hongkong to the forts at Boca Tigris, and the remaining 32 to Canton. Whampoa, the place of anchorage for trading vessels, is about 10 miles below the provincial city, and this is a great drawback, for in China our trade is always most secure under the guns of our vessels, as at Shanghae and Amoy. Until our war there was only one recognised passage between Whampoa and Canton; but the enterprise of her Majesty's ships in 1840 and 1841 discovered a convenient passage to the south, called Blenheim Reach, from that ship of the line having navigated the greater portion of the way. The principal defences of the river are, first, the famous Bogue forts, which mount some hundreds of very large guns, and, to

appearance at least, are extremely formidable. But they have been three times taken—in 1841, by Sir Gordon Bremer; in 1847, by the expedition which I took up myself; and again, in 1856, by Sir Michael Seymour. A little higher to the left is a long battery on Tiger Island, to which all ships are obliged to pass very close, on account of the shoals on the left bank of the river. No other defence occurs until the one called the First-bar Battery, on the left bank, erected about the time when Sir Thomas Herbert's light squadron routed the Chinese force in 1841. The principal defences towards Canton are at the point called the Barrier, where the two divided channels of the river unite, and where a barrier of stakes has been long constructed. Here are about six batteries, and the position would be impregnable were it not for the absurd manner in which the forts are built, upon perfectly square plans; so that if you advance on an angle scarcely a gun can be brought to bear. The embrasures, or rather windows, are almost large enough for a lord mayor's coach, and furnished with folding-doors of wood, by way of supplying plenty of splinters for the garrison. I have found no reason to change the explanation which I gave in a work on China, twenty-one years ago, of the unimproved condition of the military resources of the country. First, that pride and conceit which is a bar to all improvement in the arts, and, among the rest, the art of war. Secondly, that jealousy of the Chinese population which has prevented the Tartar Government from making of it such efficient troops as it might; for during the war we always found the greatest possible difference between the Tartars and Chinese. Thirdly, that overwhelming superiority which the empire has possessed over the petty and barbarous states on its frontiers, and which has precluded any serious calls on its exertions.

The remaining defences occur on reaching Canton. First, the French Folly (the origin of the name altogether unknown), which *was* on the east of the city, but which has been blown up and demolished by Sir Michael Seymour; the Dutch Folly, on an island in the river, which was lately occupied by our force, and from which the Viceroy's palace was bombarded and destroyed; a thing opposite the Foreign Quarter, very like a goose-pie, but named the Red Fort; and what is called the Shameen Fort, a little above the Foreign Quarter. Since our discovery and navigation of Blenheim Reach, a fort or two have been there erected. In the continuation of the same passage towards Canton is the Macao or Teatotum Fort on an island (so called, perhaps, from its square or octagonal sides), and the Bird's-nest Battery, a little higher up on the left bank. Sir Michael Seymour, in temporarily leaving the Foreign Garden, as a

less strong position, has very wisely occupied the Macao Fort, which is easily defended by co-operation with his ships. Having determined on keeping the river open pending the arrival of reinforcements, the admiral has placed his ships within signal distance of each other all down the river, so as to co-operate in case of necessity, and prevent the channel being blocked up by the Chinese. The difficulties of this plan are considerably increased by the numerous creeks and side-channels on each bank of the river, where the flat-bottomed junks can lurk and send out fire-rafts and other annoyances upon our ships, without the possibility of being followed and cut off in return. The fire-rafts, however, are not so dangerous as might be apprehended, since they can be taken in tow by rowboats, and driven on shore to burn at their leisure. The species of vessel most wanted by the last accounts were gunboats of light draft to follow up the junks into these creeks and destroy them; and, with the assistance of such, no doubt a good account will be given of the enemy. Almost every Chinese afloat in the neighbourhood of Canton is a pirate, whenever he can turn his hand that way; and perhaps one of the best results of the proposed naval expedition would be the extinction of piracy about Hongkong and the coast (interfering so seriously as it does with our trade) by disarming, and, if necessary, destroying, every armed junk fallen in with. The excuse for carrying arms is "self-defence against pirates;" but they are, in fact, all pirates in turn, and if all are disarmed equally this pretence will be annihilated.

In the mean while, both the internal and the external troubles of China seem to have conspired to favour the progress of our own colony of Hongkong. More than thirty years ago I remember sailing round it in a yacht, and occasionally landing to shoot, when it was nearly uninhabited, and now it contains 70,000 Chinese inhabitants, with occasionally as many as a hundred European ships in the harbour. This harbour is one of the finest in the world, and, according to the testimony of Admiral Cécille, of the French navy, superior to that of Rio Janeiro, which, I believe, has ranked as the first. All these circumstances combined, together with the accommodation for troops on shore, must tend to give the present expedition an immense advantage over the first one. The unhealthiness of Hongkong was experienced on the first occupation (I believe a very frequent occurrence), and this was much aggravated by the effects of Chinese spirits on our troops; for while the prisoners in gaol were quite healthy (without the luxuries which prisoners in gaol enjoy in this country), the soldiers in barracks, who had access to liquor, were dying at the rate of 10 in a week. I was rejoiced to

find, by 'The Times,' that his Royal Highness the Commander-in-Chief had himself addressed very seriously on this subject a corps of artillery at Woolwich previous to their embarkation. There is not only the inherent mischief of these unwholesome Chinese spirits (bad enough in themselves), but the additional danger of their being poisoned.

Quitting Hongkong, we may now proceed along the coast to the new ports in succession, where it is to be hoped the peacefully trading inhabitants (so different from the Cantonese) may not be disturbed by war, as most of them had plenty of it on the former occasion. If they can only experience our moderation for a time, they may perhaps at last get rid of the idea which in China attaches everywhere to an Englishman, viz. that of a *bipes implumis* who goes about surveying and map-making, with a view to ultimate occupation.

Leaving Hongkong, we proceed about 260 miles N.E. to Amoy, the first of the four new ports, and the first which felt the force of an armament in 1841. Here an immense range of stone-wall had been erected and mounted with cannon for our reception; but though the lower-deck guns of the Liners had little effect on it, the place was easily taken by escalade on the left flank of the wall. The harbour of Amoy and approach to it are extremely commodious for trade, which can be carried on close to the shipping. The small island of Koolangsoo forms the south of the harbour, and was retained by us, together with Chusan, as a guarantee for the payment of the indemnity; but on account of its extreme insignificance and the unhealthiness of our troops there, I was authorized to give it up to the Chinese government, according to instructions from home, before the expiration of the full period. Here are some curious vestiges of our former intercourse with China, in the shape of tombstones in an extraordinary state of preservation. The chief objection to Amoy as a place of commerce is the small trading capital of the native merchants. They have but few exports; and the imports which find most favour there are not our manufactures, but the productions of the Malay archipelago, which go under the name of Straits produce. The people of this province of Fokien are the most maritime of the Chinese population. Their voyages have long taken them to the islands of the above-named archipelago, where they need seldom be out of sight of land, and where they have familiarized themselves to the commerce of that region.

About 150 geographical miles to the north of Amoy lies Foo-chow-foo, the next of the new ports. This place escaped a visitation from the expedition in 1841, and would have been all the

better for some experience of our power ; for in consequence of those obstacles to the spread of intelligence already adverted to, the people retain some of their original ignorance regarding foreigners, and have besides much of the turbulence and ferocity of character attaching to their neighbours the Cantonese ; to whom, however, they bear a deadly dislike, and with whom they have a perpetual feud. It was here that an attempt was made to persuade me that our Consul at Foo-chow-foo must be excluded from the interior of the city, as he was at Canton ; but I treated it as a mere pretence—which it really was—and had the satisfaction of establishing him in a good position within the city, soon after the opening of the port. This place was not promising at first as a port of trade. The river, which is picturesque and beautiful as a natural object (being rapid and rocky like the Rhine, but much more shallow), is on that account of difficult and dangerous navigation, and the anchorage besides is 10 miles below the city. The natural advantages, however, as a mart for black teas (being so near the place of their production), have conquered other disadvantages, and the exports of tea from Foo-chow-foo have of late years become considerable.

Ningpo-foo, the next of the new ports, lies as far as 270 miles to the north of this, and afforded winter-quarters to our invading force in 1841. The union of power and clemency, which the people of this place experienced from us at that time, has been followed by the best effects, and at no spot have foreigners enjoyed more comfort and liberty in their movements than here. As a place of trade, however, it has failed. This must be attributed to the near vicinity of Shanghai, by far the best port of all, which by its superior advantages and attractions has drawn away nearly all commerce from Ningpo. The embroidered silks of Ningpo, and the ingenious works in inlaid wood, constitute the principal native productions.

Opposite to the river's mouth, at the distance of some 50 miles, lies the island of Chusan, with its chief town Tinghae. It is well known that we had possession of this fine island for about five years in all, during four of which it was retained as a security for the payment of the war indemnity of 21,000,000 dollars. It was my fate to resign it with some regret, on the payment of the last instalment in 1846 ; and as this Society has done me the honour to place a Memoir and Map of the island in its 23rd Volume, there is the less need to say anything more concerning it on the present occasion. Chapoo, a port pertaining to the famous city of Hang-chow-foo, was visited by our war-expedition ; but the tides and eddies of the dangerous estuary prevented the squadron going up to the town.

We lastly come to the very important and flourishing port of

Shanghae, something more than 100 miles to the north of Ningpo, and as much as 800 from Hongkong. Here it was that the Tartar government took serious alarm at the progress of our armament in 1842, after it had issued from its winter-quarters at Ningpo. An immense line of stone batteries had been constructed at Woosung, the mouth of the Shanghae river, but these were carried in about two hours, and the force found Shanghae itself not only deserted but a prey to hosts of Chinese plunderers. The natives showed so little patriotism here that they very merrily lent their aid to drag our guns against the town, the mandarins being all dispersed. In fact, the conduct of our force in winter-quarters at Ningpo had diffused such an opinion of our invincibility in the field, as well as of our clemency and good faith, that the people showed not the slightest objection to our approach, and this (as already observed) was one of those omens which opened the eyes of the Tartar government, and induced them to hurry the conclusion of a peace. The Treaty for this was shortly afterwards signed on board the Cornwallis flag-ship, opposite that very gate of Nanking where I myself in 1806 saw an act of incivility attempted to our Ambassador, the late Lord Amherst, in shutting the doors against him; though on a strong remonstrance being made the rudeness was atoned for, and the gates re-opened. Shanghae, as a place of trade, has more than answered expectation, having far outstripped Canton during even the few years that have intervened since 1842, and notwithstanding the troubles that ensued there from its capture by the rebels about four years ago. Circumstances here have contributed to make our condition very different from what it has been at Canton, and, instead of obtaining *less* than our Treaty rights, we have almost obtained *more*. In lieu of a mere *Consulate*, we obtained almost a *Settlement* of above a hundred acres on the river, which the neighbourhood of the rebels afterwards obliged us to fortify. Whenever the necessity for this ceases, the fortification should cease, if it were only to convince the Chinese that we do not want their territory, but only their commerce and friendly intercourse. It would not be right to conclude these observations without adverting to that splendid river, the Yang-tse-keang, on which Nanking stands, and which seems to have been specially adapted by nature to steam navigation. Lord Colchester, an ex-president of this Society, can bear me witness to its magnificent character, for we were travellers in the same boat along a great portion of its course, as far inland as the Poyang Lake. Pope says of the Thames,

‘Search not its bottom, but survey its shore.’

Lord Colchester did both; for he took soundings from Nanking to

the Poyang Lake, and with that and the compass constructed a chart which, if it is not already, ought to be, in the archives of the Society. From Nanking downwards an excellent survey has been made by Captain Collinson, R.N.

The PRESIDENT returned the thanks of the Society to Sir John Davis for his most instructive communication. They could not make a better comparison between the Chinese and ourselves, than by comparing the map of that country drawn by Mr. Arrowsmith, with the remarkable Chinese map presented to the Society by Consul Parkes. The subject of China could only be well discussed by those who were acquainted with the country; and he was glad to see present Mr. J. Crawford, and also that distinguished General, Sir Colin Campbell, who could illustrate how the Canton forts might easily be taken.

MR. J. CRAWFORD, F.R.G.S.—It was not very easy to speak with any effect after the best-informed man in Europe, and one, he believed, better informed than the Chinese themselves, respecting the empire of China. He had himself never gone farther than Cochin-China; but he had had a great deal of intercourse with the Chinese. He had lived among them, and had some authority over them, for twelve or fourteen years; and, on the whole, he was pretty well acquainted with them. He knew the emigrants tolerably well. It was well known that China was a populous country, and a country of vast extent; but mistakes prevailed respecting its population. It was said to be the most populous country in the world. This was not the case, as it was not even so densely peopled as Great Britain and Ireland. The whole area of China was 1,300,000 miles—about twelve times the extent of Great Britain. Its population was supposed to be 360,000,000, according to the census taken forty-five years ago. In Great Britain we had 300 inhabitants to the square mile, the Chinese 277. The population was most unequally distributed. In some provinces—the province of Yun-nan, for example—there were not above 50 inhabitants to the square mile, and that province is about the extent of Great Britain and Ireland put together. Then, there were some provinces which contained 600 or 700 inhabitants to the square mile, as in Che-kiang, a great silk country. The first subject he would bring under notice was the emigration from China. When Europeans were first acquainted with China 350 years ago, there were no emigrants; but the protection afforded by European governments, especially by our own, had encouraged the Chinese to emigrate and to settle in the neighbouring islands. The emigrants were all of the working classes, and they were all adult males. The women never emigrated, and the consequence was that the men were a little turbulent and ill-conducted. He estimated the number of Chinese emigrants in the eastern islands, including the Philippines, at about 350,000: there was, besides, a considerable number in Cochin-China, and a far greater number in Siam, which contained, he believed, not less than 1,000,000. All that was most valuable in Siam depended, indeed, upon the industry of the Chinese. The Chinese settlers generally were an exceedingly industrious, well-doing people, and he had never himself experienced the least inconvenience from misconduct on their part. When he was at Singapore, at the head of the civil administration, fears were at one time entertained of the Malays, and the chiefs of the Chinese came, and, in the handsomest manner possible, offered their assistance to put down the expected disturbance. He mentioned this, because it was said the Chinese were conspiring against us throughout the whole of our insular possessions. He believed there was no foundation whatever for that allegation, for he had never known them to be turbulent or disorderly. In our settlements they were upon the same footing as British subjects. They sat on petty juries, on grand juries, and some two or three of them were justices of the peace in our prin-

cipal settlements; they were shipowners, and they traded far and wide—to the Cape of Good Hope, to the Mauritius, and to every port in India. There were many wealthy people among them, and he was certain a people in their condition would not be disposed to insurrection; they knew, moreover, that they were better off under our government than any other. Our trade with China was a most important subject. The exports and imports, including the trade between India and China, could not be less than 15,000,000*l.* each, which approached the largest branch of our foreign commerce—the trade with the United States. Complaints had been made of the quantity of silver sent out of this country to the East. The cause was obvious enough. We received an immense supply of productions from China, and, of course, were obliged to pay for it in silver. With respect to the opium trade, he approved of it entirely. He thought the use of opium as innocuous as the use of any description of wine, and a good deal more so than that of brandy or other ardent spirit. He had the authority of Sir Benjamin Brodie for this. That eminent medical authority said that opium soothed the nervous system, while brandy and all alcoholic spirits irritated it exceedingly. Both were, of course, liable to abuse; but he conscientiously believed that opium was much more rarely abused than ardent spirits. Some people fancied that the Malays took opium for the express purpose of running a-muck. Now, when the Malays and Chinese took opium, they smoked it in the form of a little ball, not much larger than a swan-shot; half a dozen whiffs sent them fast asleep, and when asleep, they dreamed they were in a Mahommedan paradise making love to houris. That was surely not the condition for a man to run a-muck in. The Indian government received about 3,000,000*l.* a-year from the opium trade—about one-seventh of their entire revenue. It was not our business to put a stop to the trade. So long as the traffic was prohibited by the Chinese, smuggling must take place; and that could only be put a stop to by the Chinese legalising the traffic and imposing a moderate duty upon the article. It was argued that it was the duty of the Indian government to suppress the growth of the poppy, in order to favour an absurd and ridiculous prejudice on the part of the Chinese. The ‘*Edinburgh Review*,’ in its last number, proposed that we should enter into a treaty with the Chinese, and bind ourselves to put an end “progressively” to the growth of the poppy in India for the production of opium for exportation. We could not do that without “progressively” putting an end at the same time to our Indian empire; for, without the 3,000,000*l.* revenue derived from opium, it would be impossible to carry on the Indian government. There were other articles of import into China of some importance. The raw cotton of India was sent in considerable quantities to China; and that was one reason why (the gentlemen of Manchester should understand) it did not come to England. The cotton-wool imported into China was of the value of 500,000*l.* sterling, whereas the opium taken annually was of the value of 5,000,000*l.* To ask us to put a stop to the growth of the poppy, would be just as reasonable as to ask the French to put an end to the growth of the vine, because spirits and wine were sometimes productive of drunkenness in this country. Among other imports into China were the swallows’ nests, a gelatinous substance, almost tasteless, but in much repute for making soup. There was another article of commerce, the sea-cucumber, of which specimens might be seen in the Gardens of the Zoological Society. Several thousand tons were imported into China annually. The Malays proceeded as far as the Gulf of Carpentaria in search of this article, and there Captain Flinders found them fifty years ago. Another article of import he might mention, was camphor, not the common camphor, but concrete camphor, obtained from a certain tree; it was valued for its supposed restorative properties, as are the other articles just named. With respect to the exports of China, he would only touch upon two—tea and raw silk. It was not until the

middle of the seventeenth century that the use of tea was known to Europeans. The first tea introduced into England was a packet of 2 lbs. 2 ozs., sent as a present to Charles II. by the East India Company in 1664. It was not obtained in China, but at Bantam; it was what is now called junk tea, and execrable stuff it must have been. Forty-six years afterwards we consumed about 1,000,000 lbs. of tea. In the first year of the next century our consumption of tea, notwithstanding monopoly, taxes, and duties, had risen to 20,000,000 lbs. In 1833, before the monopoly of the China trade was overthrown, it was 30,000,000 lbs., and last year our consumption was 63,000,000 lbs. We paid for this tea about 5,000,000*l.*, exclusive of the duty, and the duty amounted to about the same sum; so that our tea cost us 10,000,000*l.* prime cost, exclusive of retail profit. He had no doubt the consumption would continue to increase. A few words respecting the raw silk. Down to the years 1833 and 1834, the East India Company asserted that it was impossible to extend the production of raw silk. The monopoly was overthrown, and the importation of raw silk from China had risen from 2000 bales in that year to 20,000 bales in the year before last. This year, owing to the failure of the silk crop in France and Italy, the importation of Chinese silk will be 70,000 bales. Having thus spoken of the commerce of China, he would say a word about the war. The only point on which he begged to differ from Sir John Davis was with respect to the mode of carrying it on. Sir John Davis seemed to think that the attack and capture of Canton would be all-sufficient. He did not think so. It was not found to be so in the previous war.

SIR JOHN DAVIS.—We never captured it.

MR. CRAWFORD.—We did pretty much the same; we inflicted a heavy fine. Being 1200 miles from the seat of the Chinese government, the capture of Canton would not be sufficient. He thought we must do what we did before—cut off the communication between the northern provinces, containing the capital, and the southern, the chief sources of the supply of food and revenue.

MR. ED. DIVETT, M.P., F.R.G.S., wished to ask a question respecting a subject of great interest. Sir John Davis had spoken of the piracy which existed in the Chinese waters. He should be very glad to know whether the same sort of piracy was practised on the other parts of the Chinese seaboard?

SIR JOHN DAVIS.—The piracy which prevailed on the coast of Canton, and of the neighbouring province, Fokien, was very much the result of the physical configuration of the coast, which was that of an archipelago of small islands, abounding in harbours and indentations, affording lurking-places for predatory vessels. The very extensive system of fishing which prevailed on such a coast created those maritime habits so favourable to the life and profession of a pirate. They were, in fact, fishermen to-day and pirates to-morrow. The evil did not extend beyond the province of Fokien, to the same degree at least. It was absolutely necessary for the safety of our commerce, and for that of the Chinese *themselves*, that it should be put down in the most summary manner possible, and there could be little scruple in acting thus against those who were in fact the enemies of the human race, and the worst obstacles to commerce. With the possession of the light draft gunboats which we were about to send out, there never was such an opportunity for getting rid of them—disarming all, without exception, if not destroying them. He would now advert to the observation of Mr. Crawford on the subject of resorting to the mouth of the Grand Canal and the neighbourhood of Nanking. He should be the last man to say a word against it, because before the last war he had recommended in distinct terms to the Duke of Wellington himself the adoption of the plan, which plan was adopted with complete success. But at the present time the ground was pre-occupied by the insurgents. They had, by possessing Nanking and the canal, cut off the communication with Peking that way, as well as we could, and by

going there we should only come in collision with those to whom we have always professed perfect neutrality,—we must become either their allies or enemies. The communication with Peking had been at one time, if it was not now, as effectually cut off as if we were to go to the neighbourhood of Nanking. With respect to the effect on Peking of the capture of Canton, we had in reality never yet occupied the place. We had threatened it, but we allowed it to be ransomed by the Hong merchants, instead of the inhabitants themselves, and they had laughed at us ever since, as well they might. If we were fairly to *occupy* Canton, quarter our troops upon it, and make the inhabitants pay all that our merchants have lost, they would never forget it, and there would be an end of their “braves,” as they called their vagabond militia. The people did not pay a fraction of the last ransom; it was the Hong merchants who paid it. Canton was a provincial capital, the capital of *two* provinces; and if we were fairly in possession and our troops quartered there, it would make the Imperial Court listen to our terms to get rid of us.* With regard to opium, he quite agreed with Mr. Crawford as to the physical effects of the drug. It was infinitely less deleterious than the spirits which we license and encourage in England, and the consumption of which particularly disgraces the English *Sundays*, from the want of more inviting recreations for the lower orders. It seemed to himself quite superfluous attempting to put an end to the traffic, for since the war and the treaty of Nanking the Chinese had utterly abandoned all attempts to stop its sale and consumption. Several of our consuls had officially reported to him that they had seen it carried about in broad day, and consumed in regularly licensed houses. It would be the extreme of impertinence on our part to interfere with an article which the Chinese voluntarily admitted; we had no more right to interfere than the Chinese had to interfere with our consumption of both opium and (what was worse) spirits. The emigration alluded to by Mr. Crawford was a beneficial emigration, and one which ought to be encouraged. But there was another sort of emigration which was a disgrace to this country, and which ought to be at once stopped. This was the exportation to Cuba of coolies, who of course became slaves. He first got a glimpse of it when he was in China, and the instructions he issued to our consuls on the occasion prevented its spread at that time. Since then, however, the evil had extended, and the horrors endured by the coolies on board were equal to those of the middle passage between Africa and the West, with an enormously lengthened voyage. He trusted it would speedily be put a stop to. In vain would Wilberforce and Clarkson have exerted their energies in the abolition of the slave-trade, if it was to be revived in this new shape. This was the *real* grievance of China against us, and not the opium trade, which their own toleration of it had taken out of our hands.

The EARL ALBEMARLE, F.R.G.S.—Do I understand that the rebels are in possession of the Imperial Canal?

SIR JOHN DAVIS.—They are, or have been, in possession of the mouth of the canal—exactly the neighbourhood where we dictated peace. Chin-kiang-foo is

* Lieut.-Gen. Sir Colin Campbell received these very remarkable observations in a note some years ago from the late Consul Thom, and allows their publication:—“Having once made the demand, we can hardly withdraw from it without confirming the Chinese in the impression that we are *afraid* of the Canton people. This impression *has* gone abroad over the empire, and a most fatal and unhappy impression it is; and this same impression may very likely cause seas of blood at some future day. In itself, the opening of the gates of Canton is (to individuals) neither here nor there; but being made the touchstone of whether we fear the Canton people or not, this gives it *immense importance*.” It is quite clear that Canton must be opened *vi et armis*; all other means would fail, either immediately or ultimately, on account of the “impression” which the Consul very truly and wisely commented on.—J. F. D.

the last place we took, and the city which commands the entrance of the canal northwards. The rebels are, or were until very lately, in possession of Chin-kiang-foo.

SIR COLIN CAMPBELL rose to say that Mr. Bowring, a young friend of his, son of Sir John Bowring, mentioned to him, a morning or two ago, that, within the last two years, two vessels had been sent up to Nanking by his father to ascertain what the insurgents were about, their numbers, and the manner in which they were occupying the country. That object was completely obtained, for he found the rebels at Nanking, but they had not come down so far as Chin-kiang-foo.

SIR JOHN DAVIS.—Mr. Meadows, in 1853, saw the rebels there, and conferred with them.

SIR C. CAMPBELL.—They were not in possession of Chin-kiang-foo, according to Mr. Bowring, when he was there; and without actual possession of that point you do not command the canal.

The EARL ALBEMARLE.—It is the point of junction.

SIR C. CAMPBELL.—It is. He remembered, when he went up there in command of a regiment, under Lord Saltoun, they were placed outside the town. One of the officers found a house where there was a number of papers, and brought the bundle to him as a curiosity; and it turned out to be a despatch from the officer who commanded the Chinese troops. It was translated by Mr. Thom, and described this officer's movements. It was addressed to the Emperor, and it mentioned his route, his march downwards, in obedience to the orders of the war department there, and stated that, instead of carrying out the farther orders of his Majesty, he had stopped at this place, which he called "the very throat between the north and south." He described that point, Chin-kiang-foo, as the "throat." And the English were at that throat.

SIR J. DAVIS.—Mr. Meadows, who was despatched by the British Plenipotentiary to communicate with the rebels, actually had his audience at Chin-kiang-foo with the leaders, and describes it in his book. Possibly they had abandoned the point since.

SIR C. CAMPBELL.—It appeared strange that they should be in force at Nanking, and not in possession of Chin-kiang-foo.

2. *North Australian Expedition.*

The following letter, from the Commander of the expedition to North Australia, was read by the Secretary:—

Burnett District, 2nd December, 1856.

SIR,—I have the honour to inform you of the arrival of the North Australian Expedition within the limits of the settled parts of New South Wales.

From the time of landing the horses at Point Pearce in September, 1855, to the 9th May, 1856, the party was employed in preliminary details, and the exploration of the country to the south of the Victoria River, having penetrated the interior deserts to latitude 18° 20' south, and longitude 127° 30' east; a detail of which I forwarded by the 'Tom Tough' schooner, viâ Copang, and which doubtless has already come to hand.

The schooner 'Tom Tough' having been seriously damaged in

ascending the Victoria River, and a quantity of stores and provisions thereby destroyed, I instructed Mr. Baines to embark that portion of the expedition which was not required to form the land party, and to proceed to Copang for supplies, and thence to the Albert River in the Gulf of Carpentaria, to co-operate with the land expedition.

On the 21st June I left the encampment on the Victoria River, with a party of six persons, viz. Mr. H. Gregory, Mr. Elsey, Dr. Müller, and three men—Dean, Bowman, and Melville.

The arid nature of the country in the interior of Northern Australia compelled us to increase our latitude to 15° S. in order to pass the central parts of Arnheim-land, after which we kept parallel to the coast as far inland as water could be found in the rivers, the greatest distance from the sea not exceeding 100 miles.

Reaching the appointed rendezvous at the Albert River on the 30th August, the schooner had not arrived, but, from some marked trees, it appeared that Her Majesty's Ship 'Torch' had sent a boat up the river a few weeks previous, but it was evident that this visit had no reference to the expedition, as the only marks left consisted of the names of some of the crew, which they had amused themselves by carving on the trees and stumps; and the ashes of their fire.

Under these circumstances, I deemed it not advisable to wait the arrival of the schooner; and having marked trees, and buried instructions for Mr. Baines at a spot which had been previously agreed upon, we left the Albert on the 3rd September, and made some ineffectual attempts to proceed to the south-east, but want of water compelled me to pursue a route parallel to the coast to latitude $17^{\circ} 20'$ S., when the Gilbert River enabled a S.E. course to be again pursued.

Crossing the heads of the Lynd in $18^{\circ} 40'$, we reached the Burdekin on the 16th October. Our route was then along the right bank of that river to the junction of the Suttor River, which was followed up to the Belyando River. Tracing that river to latitude 22° , we then pursued a south-east course to the junction of the Comet and Mackenzie Rivers, and from thence to the Dawson brought us to Messrs. Connor and Pitt's station on the 22nd November.

I am now on my way to Brisbane, where I purpose to leave the horses until arrangements can be made for their disposal, and proceed direct to Sydney.

(Signed)

A. C. GREGORY,

Commander N. A. Expedition.

The PRESIDENT said he held in his hand a letter from this distinguished explorer himself. The Society would be delighted to know that the Council had that day awarded one of its Gold Medals to Mr. Gregory, for there was scarcely any exploration in his time which seemed more worthy of the commendation of Geographers, than this exploit of Mr. Gregory. It would be recollected that the expedition was really undertaken by her Majesty's Government at the suggestion of the Geographical Society. In the course of his journey Mr. Gregory penetrated into the interior, in order to ascertain whether it was a vast saline desert, and he tested it on two or three points before he retraced his steps to the Victoria. He came to a valley which, according to his letter, far surpassed the best parts of Western Australia, both in fertility and extent, and also for settlement.

MR. J. CRAWFURD, F.R.G.S., believed Mr. Gregory to be an admirable explorer. He had told the whole truth, and that truth amounted to this—that the country he had explored was totally unfit for European settlements. He could not see how any country lying between 11° and 16° of latitude could be fit for the settlement of the Anglo-Saxon race. The heat must be intense. The grassy plains would fatten bullocks, but who were to eat the bullocks when they were fattened?

The PRESIDENT.—Mr. Gregory does not think so.

MR. CRAWFURD.—Mr. Gregory knew less than he did of countries so near the equator. He was perfectly certain the Anglo-Saxon race would never settle there.

LIEUT. CHIMMO, F.R.G.S., hoped these recent accounts would convince the public of the worthlessness of the country about the Gulf of Carpentaria.

The PRESIDENT.—That is quite another region, and differs from the valley of the Victoria.

LIEUT. CHIMMO read an extract or two from Mr. Gregory's communications respecting the climate and soil of the Gulf of Carpentaria, and said it was exceedingly gratifying to him that Mr. Gregory had corroborated the views that he had, on more than one occasion expressed, that the country along the Gulf of Carpentaria was entirely unfit for European occupation.

MR. CRAWFURD observed that the Victoria seemed to be the only considerable stream that existed in that part of Australia. He placed no reliance on the two to three hundred rivers that one gentleman spoke about, as falling into the Gulf of Carpentaria. If they all ran in one channel and formed one river, they would be more serviceable. With regard to the navigability of the Victoria, the schooner only ascended it fifty miles.

MR. T. SAUNDERS said, that if Mr. Gregory had pursued the same system of investigation, at the Gulf of Carpentaria, which he had pursued on the Victoria, his evidence as to the character of the country about the Gulf would have been worth as much as his evidence respecting the Victoria. But instead of following the streams up to their sources, as he had done with the Victoria, whereby he discovered the nature of the country far into the interior, he, on the Gulf, merely *intersected* the rivers a little distance farther towards the interior, than Leichardt had already done. Had he pursued the courses of the streams, he would probably have found all that Leichardt said he had experienced, with respect to the salubrity of the climate and the fertility of the soil in the Gulf of Carpentaria.

The PRESIDENT, before adjourning the meeting, announced that a communication had been received through the Foreign Office from our consul at Tripoli, stating that he heard no confirmation of the report that Dr. Vogel, the African traveller, had been assassinated. There was no foundation for the statement except the African report, and he, for one, would not believe it before it had been proved.

Twelfth Meeting, May 11th, 1857.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

ELECTIONS.—*Major the Hon. Wenman Coke ; Lord Dufferin ; Commander C. Rundel Egerton, R.N. ; Sir A. H. Elton, Bart., M.P. ; Captain M. S. Nolloth, R.N. ; Viscount St. Vincent ; and J. Bartholomew, jun. ; R. C. Marsden ; Arthur Mills ; L. R. Reid ; John Ross ; and J. W. Willcock, Q.C., Esqrs., were elected Fellows.*

DONATIONS.—The following were among the donations to the Library and Map-Rooms received since the former meeting:—A Chart, framed, showing the intended telegraph communication between Newfoundland and Ireland, &c., presented by Mr. Brook-
ing, F.R.G.S. ; Maps of Moldavia and Bessarabia, by Consul Gardner, of Jassy ; the Transactions of the Lombardo-Veneto Institute of Milan ; of the Imperial Geological Institute of Vienna ; and the Academy of Sciences, Paris ; Barth's Travels in Central Africa ; Lessep's Isthmus of Suez, &c.

EXHIBITIONS.—Among the articles exhibited were Reeder's Patent Mariner's Compass ; Sheets of the original drawings of some of the Admiralty Surveys during the past season of Sheephaven, Mulray, Donegal, Dingle, and Ventry Harbours, and the Frith of Forth, by Captain Bedford, F.R.G.S., Mr. M'Dougal, and Lieutenant Thomas, R.N. ; Map of the World, on the Homalographic Projection of the Sphere, by J. Babinet ; with Maps of the Crimea and other places, engraved on a new principle on stone, by Erhard, and published by E. Bourdin, of Paris.

ANNOUNCEMENTS.—The President informed the Meeting of the departure of the Niger expedition under Dr. Baikie, F.R.G.S. ; and stated that the report in circulation of the death of the enterprising and intrepid African traveller, Mr. C. J. Andersson, was happily without foundation. He was sorry, however, to add that another Swedish traveller, Dr. Wahlberg, had perished in an encounter with an elephant to the northward of Lake Ngami. A letter from Mr. K. L. Sutherland, F.R.G.S., was then read, suggesting the advisability of a Naturalist being on board the 'Agamemnon' in sounding the Atlantic and laying down the Telegraph cable. The Chairman next mentioned that, owing to the inadequacy of the Meeting Room to accommodate the rapidly increasing numbers of Fellows and Visitors who—as he was glad to see—were in the habit of attending, a Resolution had been passed at the Council that day, that he should represent the case to the President of the Council-Board of Educa-

tion, and request permission to hold their meetings, next session, in the Theatre of the Government School of Mines, in Jermyn-street. The President finally drew the attention of the Society to the approaching Anniversary Meeting, on Monday, the 25th inst., at one o'clock, when the Annual Address would be delivered, and the Gold Medals for the year awarded to Mr. A. C. Gregory, Commander of the North Australian Expedition, and to Lieutenant-Colonel A. S. Waugh, Surveyor-General of India; and likewise to the Dinner, which would take place at the Freemasons' Tavern, at seven o'clock, when he hoped to see the Chair well supported by the Fellows and their friends.

The papers read were :—

1. *Papers relating to the Himalaya and Mount Everest.*

A. By Lieutenant-Colonel A. S. WAUGH, Surveyor-General of India, dated Dehra, March 1st, 1856; and

B. By B. H. HODGSON, Esq., dated Darjiling, Oct. 27th, 1856.

(A.)

SIR,—With my letter No. 99, of 18th December, 1855, I transmitted a Geographical Memorandum on the identification and revision of height of the famous mountain of Dwalagiri, originally measured by Captain W. S. Webbe, and at one time supposed to be the highest mountain in the world, though my operation in 1847 proved Kunchinginga to be much higher.*

You are aware that the computations of the positions and elevations of all the principal peaks of the stupendous Himalaya, comprising $18\frac{1}{2}$ degrees of longitude, from Assam to the Safed Kho, have been provisionally completed, and I intend to make this subject one of special report for publication.

Previous to publication, however, it is essential that the computations should be scrupulously revised and every refinement of correction introduced. This I do not expect will materially modify the results.

The revision has proceeded to some extent, and I am now in possession of the final values for the peak designated XV in the list in the Office of the Surveyor-General of India.

We have for some years known that this mountain is higher than any other hitherto measured in India, and most probably it is the highest in the whole world.

I was taught by my respected chief and predecessor, Colonel

* See Asiatic Researches, vol. xii.

Geo. Everest, to assign to every geographical object its true local or native appellation. I have always scrupulously adhered to this rule, as I have in fact to all other principles laid down by that eminent graduist.

But here is a mountain, most probably the highest in the world, without any local name that we can discover, or whose native appellation, if it have any, will not very likely be ascertained before we are allowed to penetrate into Nepal and to approach close to this stupendous snowy mass.

In the mean time the privilege, as well as the duty, devolves on me to assign to this lofty pinnacle of our globe, a name whereby it may be known among geographers and become a household word among civilized nations.

In virtue of this privilege, in testimony of my affectionate respect for a revered chief, in conformity with what I believe to be the wish of all the Members of the scientific department, over which I have the honour to preside, and to perpetuate the memory of that illustrious master of accurate geographical research, I have determined to name this noble peak of the Himalayas 'Mont Everest.'

The final values of the co-ordinates of geographical position for this mountain are as follows, viz. :—

Mont Everest, or Himalaya Peak XV.

Latitude N.			Longitude E. of Greenwich.			Height above Sea-level.
°	'	"	°	'	"	Feet.
27	59	16.7	86	58	5.9	29,002

As it will be interesting to you to see the independent results for all our observations to this mountain, and to contrast them with those of other celebrated peaks, I herewith append an attested statement of the geographical positions and elevations of Dwalagiri, Mont Everest, Kunchingira, and Choomalari.

You will perceive that the results are all satisfactorily accordant. In the case of Mont Everest the accordance of the independent heights is closer than could have been anticipated, because the mountain, though lofty and massive, is not a sharp well-defined peak and was observed from great distances.

You are at liberty to make use of these results, in anticipation of my forthcoming report on the positions and elevations of all the principal peaks of the Himalaya range.

In justice to my able assistant J. Hennessey, Esq., it is proper to acknowledge, that I am greatly indebted to him for his cordial co-operation in revising these computations.

Geographical Position and Height above Sea-level of certain Points in the Himalaya Mountains.

H. S. signifies Hill Station. T. S., Tower Station.

Intersected Object.	Station of Observation.	Latitude N.			Longitude E. of Greenwich.			Height above Sea-level.
Choomalari, or I.	{ Senchal, H. S. . . .	°	'	"	°	'	"	Feet.
	{ Tonglo, H. S. . . .	27	49	41·5	89	18	43·1	23,946
				41·5			43·1	41
	Mean . . .	27	49	41·5	89	18	43·1	23,946
Kunchenginga, or IX.	{ Dom Dangi, T. S.	27	42	9·5	88	11	26·4	28,151
	{ Senchal, H. S. . .			9·3			26·2	50
	{ Birch Hill, S. . .			9·4			26·2	63
	{ Thakoorganj, T. S.			9·8			26·7	47
	{ Tonglo, H. S. . .			9·3			26·2	80
	{ Banderjoola, T. S.			9·2			26·1	42
	{ Menai, T. S. . . .			9·2			26·3	72
	{ Baisi, T. S. . . .			9·6			26·3	60
	{ Harpoor, T. S. . .			9·5			26·3	40
	Mean . . .	27	42	9·4	88	11	26·3	28,156
Mont Everest, or XV.	{ Doom Dangi, T. S.	27	59	16·5	86	58	5·8	..
	{ Menai, T. S. . . .			17·1			6·1	28,990
	{ Harpoor, T. S. . .			16·5			5·7	9,026
	{ Ladnia, T. S. . . .			16·7			5·8	8,999
	{ Janjpati, T. S. . .			16·7			6·0	9,002
	{ Miriapoer, T. S. . .			17·0			5·8	9,005
	{ Jirol, T. S. . . .			16·7			5·8	8,992
	Mean . . .	27	59	16·7	86	58	5·9	29,002
Dwalagiri, or XLII.	{ Ramnagar, T. S. . .	28	41	47·9	83	32	8·8	..
	{ Morairi, T. S. . .			48·1			8·3	26,815
	{ Banarsi, T. S. . .			48·1			8·7	..
	{ Saoubarsa, T. S. . .			47·8			8·9	60
	{ Poovenah, T. S. . .			47·8			8·9	43
	{ Ghaos, T. S. . . .			48·2			8·2	6
	{ Toolsipoor, T. S. . .			48·2			8·4	61
	{ Anarkali, T. S. . .			47·8			8·8	..
	Mean . . .	28	41	48·0	83	32	8·6	26,826

NOTE.—The longitude is referable to the old value for the Madras Observatory, $80^{\circ} 17' 21''$, to which a correction of $3' 25\cdot5''$ is applicable to reduce to the value adopted by the Admiralty and Royal Astronomical Society, or $3' 18''$ to reduce to the result of Taylor's observations up to 1845.

(B.)

SIR,—In the report which has just reached me, it is announced that a "nameless" peak, situated north-east of Kathmandu, and in east longitude 87° , had at length been definitely ascertained by our

very able Surveyor-General, Colonel Waugh, to be upwards of 29,000 feet high, and consequently to be the loftiest, yet known, peak of the Himalaya.

Agreeing as I do with Colonel Waugh in the propriety of adopting native names, and cordially sympathising with the sentiment which gave rise to the name Mount Everest, I trust I may be permitted, without offence, to state, in justice to my friends the Nepalese and to myself, who have been so long connected with them, that the mountain in question does *not* lack a native and ascertained name; that that name is Dévadhúnga, Holy hill, or Mons Sacer; and that it is expressly referred to under that name in our Journal. To the paper styled 'Route from Kathmandu to Darjiling,' there is appended a 'Memorandum relative to the seven Cosis.' In the latter occurred the following words: "The Bhotia Cosis" has its source at Déodhúnga, a vast Himalayan peak situated 60 to 70 miles east of Gosainthán, and which Colonel Waugh conjectures may rival Kunchenginga in height." In the rude sketch map which accompanied that paper, Déodhúnga was set down in the position indicated, and that that position tallies with the site of Mount Everest, is clear from the words above quoted, since "60 to 70 miles east of Gosainthán," answers precisely to east longitude 87° , Gosainthán being in 86° east longitude.

Other indications equally correspond, and at the same time show why such an object could not remain unnamed or unascertained.

Thus Dévadhúnga and Mount Everest are both "about 100 miles N.E. of Kathmandu;" both are midway between Gosainthán and Kangechan; and, lastly, both are by their position and by the absence of any like mass of snow in all the intervals between those peaks, identifiable with the so-called Kútighát, or the great *Gate*, which annually for half the year is closed by Winter upon the Eastern highway of Nepalese commerce and intercourse with Tibet and China.

A few words more may be given to this last point, as being the matter which chiefly fixed my attention, as a political officer in Nepal, on the site of Mount Everest, and enabled me at once, when I heard in after years surmises of the great height of a peak in that direction, to fix on Dévadhúnga, or Bhaíravthán (both names are used) as being the "enormous snow mass" in question; and I have often of late repeated this here, very recently to Mr. Blanford. Round the shoulder of Dévadhúnga runs, as above intimated, the great Eastern highway (the western being round the shoulder of Gosainthán) of the merchants and envoys of Nepal proceeding to Lássa and Pekin; and this passage along the shoulder of the huge

snowy mass of Dévadhúnga is denominated the Kutighát by the Hindoos and the people of the plains of India, as the passage round the huge snowy mass of Gosainthán is denominated by them the Kérung, or Western Ghát. But Kúti and Kérung are names of towns, the one situated considerably within, and the other considerably beyond, the respective gháts; and, moreover, the word ghát is never used by the highlanders (Parbattias) of Nepal for a snow-pass. Their word is "lángúr," and the especial lángúr in question is named Bhaírava lángúr, or the pass of Bhaírava, just as the mass above it, is called Bhaíravthán, or abode of Bhaírava: Bhaírava being the terrific form of the God Siva. Every merchant and statesman at Kathmandu talks familiarly of the Bhaírav lángúr, owing to its formidable character, its obstructiveness (it bars the road to the North for half the year), and its strange contrast with that very extensive and very level tract of country in Tibet, called the Tingrí Maidan, on which the Bhaírav lángúr immediately opens. And this marked character of the ghát, added to the unmarked character of the peak above it, may be one reason why the two are often confounded under the same appellation. But Dévadhúnga and Bhaíravthán are nevertheless sufficiently familiar and correct names for this peak, or snowy mass rather; and it were indeed a strange circumstance, if so remarkable a natural object had escaped the notice of the people of the country and thus remained unnamed. Nor would it have been very creditable to me after 20 years' residence in Nepal, had I been unable to identify that object. The two papers herewith submitted, together with those formerly submitted to the Asiatic Society of Bengal,* or to Government, will, I trust, show that I have given as much attention to the general subject of Nepalese Geography as my opportunities and training admitted and my duty required, whilst the foregone remarks must satisfy every one that this special object, supposed to have been heretofore utterly unhceded, was one so situated and circumstanced that no reasonable excuse for ignorance of it on my part could be made, it being clear that personal approximation was no more a

* 1. Military road throughout the centre of Nepal from Kamaon to Sikim; to the Government.

2. Route from Kathmandu to Tazedo on Chinese frontier, to the Society, and published in its Researches.

3. Route from Kathmandu to Darjiling, to the Society, and published in its Journal.

4. Physical Geography of Himalaya, to the Society, and published in its Journal.

5. Visit to Nagakote, with notice of the rivers flowing into it. Printed in the Journal.

6. Various routes through Nepal, from and to places specified. Sent to Government, and deposited in its archives.

7 and 8. Two Journals of embassies from Nepal to Chira, now sent.

necessary condition of ascertaining the name than it was of determining the height, of Dévadhúnga.

The only doubt in my mind is the greater or less prevalence in Nepal Proper of the term Devadhúnga.

Having possibly obtained it from persons dwelling in the vicinity of Kúti, not at Kathmandu, I have written to Kathmandu to determine that question, and will here only add, that should the name prove to be more familiar to the people of the Cosean basin, than to those of the valley and capital, it will not be one whit less a "true native name," just as Colonel Waugh's own "Powhanri" is as true a native name, as Dr. Hooker's "Dónkia," in relation to a Sikim peak and Ghát.

B. H. HODGSON.

To the Secretary of the Royal Geographical Society.

The PRESIDENT was sure all who were present would be delighted if this mountain should for ever retain the name of the distinguished geographer who, following Lambton in the great trigonometrical survey of India, had been the means of carrying on that magnificent operation, which had been conducted to a conclusion by Colonel Waugh. A more appropriate name could not be given than that of Mount Everest; and, whatever might be its name in India, he hoped, in England at least, it would always be known by the name of Everest.

MR. PRINSEP, F.R.G.S., said it was known that the Himalaya range extended many degrees in length, and that in the whole course of it there were mountains of various heights. Some of them were the highest in the world. Those which had been really measured, overhung the plains of India, and until recently, it was supposed that the highest were near the sources of the Ganges. Since then, however, the discovery had been made that there was a mountain 28,000 feet high; and the present discovery showed another in Thibet, within sight of the territory of Nepal, 29,000 feet high. When we came to measure the mountains, in which the rivers of China rose, we should perhaps find some of them 30,000 feet high.

COLONEL EVEREST, F.R.G.S., begged to say that the very kind manner in which his successor and friend, Colonel Waugh, had spoken of him was far beyond his merits. He had certainly an arduous task in India to perform, and he did his best to bring it to maturity. One of the best measures he effected was to bring forward into the department a gentleman of Colonel Waugh's talents. The Court of Directors of the East India Company had the good sense to select Lieutenant-Colonel, then Lieutenant Waugh, upon his (Colonel Everest's) representation of his merits. Colonel Waugh had fully borne out those representations, and he believed the Court of Directors were thoroughly satisfied in accepting his recommendation. The decision of Colonel Waugh, in giving his name to this high mountain, he certainly never contemplated. But as a spontaneous effusion of the regard of those Indian surveyors, the most efficient of whom were bred in the department, educated in fact by himself, the proceeding was very grateful to him personally. Yet he must confess there were objections to his name being given to this mountain, which did not strike everybody. One was, that his name was not pronounceable by a native of India. The name could not be written in either Persian or Hindi,

and the natives could not pronounce it. It would be confounded with that of O'Brien, and the hill people would probably call this mountain Ob'ron. As another instance of the difficulty which the natives experienced in pronouncing English names, he might, among others, mention that the name of the "Hon. Mr. Cavendish" was pronounced by them "Humbel go munde."

2. *Notes on Moham'rah and the Chaab Arabs, etc.* By Col. Sir HENRY RAWLINSON, K.C.B., F.R.G.S., etc.

SIR H. RAWLINSON said he held in his hand a report upon Moham'rah and the Chaab Arabs, which he had prepared for the information of Her Majesty's Government about thirteen years ago, when the dependency of the first-named place was contested between the governments of Persia and Turkey, and when those powers had accepted the arbitration of England and Russia in the settlement of the dispute. Although this report, treating almost exclusively of political geography, might, perhaps, with some alterations and additions, be made fit for publication in the *Journal of the Geographical Society*, still he thought the Meeting, instead of having inflicted upon them a dry catalogue of barbarous names, and a still drier disquisition on the nationality of disputed territory, would prefer hearing something of the actual position and history of Moham'rah, a name which had now become, as it were, a household word in our annals. Therefore, instead of reading the official report, he proposed to divide his address into three parts. In the first place, he would trace upon the map the configuration of the adjoining country and explain something of the actual geography of Moham'rah. In the second place, as the ancient history of Moham'rah was of considerable interest, he would read a few notes which he had drawn up upon the comparative geography of the region in which it was situated from the earliest times. And, thirdly, if time permitted, he would offer a few observations upon the place, as connected with our recent military operations; that is in reference to the Persian war which had just been brought to a conclusion by Sir James Outram.

Moham'rah, as the meeting was aware, was the scene of our latest, and he hoped he might say, our last, military exploit against the Persians. It had thus become a place of very great interest; but he believed that at the present hour (as the town was not marked upon any of the standard published maps), there were very few people who were acquainted with its exact position. He proposed therefore, in the first place, to show exactly where it was, and to trace the geography of the surrounding country. The map before the Meeting exhibited the whole of the northern coast of the Persian

Gulf. It might be remembered that in the first instance the expedition of General Stalker had landed at Bushir, and that from that place a second expedition had subsequently moved on to Moham'rah. The line from Bushir to Moham'rah ran across the northern part of the gulf to the mouth of the Euphrates, Moham'rah itself being placed at this point, and the only practicable mouth of the Euphrates being here, and when he called this a practicable mouth, he might add that it was not practicable in our ordinary acceptance of the term—that is, it was not practicable like the Thames. He believed, indeed, that in the highest tide there were never more than three fathoms on the bar, and generally the depth of water was but from twelve to fourteen feet. He remembered on one occasion when he sailed into the Euphrates in her Majesty's ship 'Clio,' Captain FitzJames, the vessel grounded on the bar to the great horror of the captain, who immediately assailed the old Arab pilot for his carelessness in not keeping the ship in deeper water. The pilot, however, was by no means disconcerted; he very composedly sat himself down on the quarter-deck, with his pipe in his mouth, and replied as follows:—"Really," he said, "I did not make the 'Clio,' nor did I make the Euphrates; if you will come here in a big ship like this, and go across the bar, you must expect to get into the mud. But it will not hurt you," he added; "if you only wait here quietly till the tide rises you will get off without damage." And such was the case. The mud was so soft that no inconvenience whatever was experienced, and as soon as the tide rose the vessel floated off and pursued her way up the river.

On the present occasion he understood that the entrance channel at the mouth of the river had been buoyed throughout, so that the vessels would probably have all crossed the bar without grounding. If any of the ships had, however, run aground in the mud, they would get off again without injury as soon as the tide rose. There was but one practicable entrance to the Euphrates. Very few of the river beds marked upon the map as forming the Delta of the Karún and Euphrates, were navigable; most of them, indeed, were entirely dry. The only channel practicable for vessels of any considerable draught was the most western mouth of the Euphrates. From the embouchure the distance to Moham'rah was about forty miles. In proof of the difficulty of entering the Euphrates it might be observed that the flotilla which left Bushir on the 19th of March was only enabled to attack Moham'rah on the 26th, a full week afterwards, although the actual distance was under 200 miles and the transports were towed up by steamers.

After he had read his notes upon Moham'rah he should describe

how he supposed the attack to have taken place, judging from his personal knowledge of the country, and from the accounts he had received from the spot, of the commander's intentions. At present it was of more importance that he should explain the particular geographical configuration of the place, in reference to its national dependency: one of the questions constantly asked being, "Where is Moham'rah? is it in Persia or in Turkey? or is it on the frontier between the two countries?" Now there was a little map hanging on the wall, which had been drawn up by the Turco-Persian Frontier Commission, presided over on our part by our associate Sir Wm. Fenwick Williams, and which showed the exact frontier between the two countries the whole way from Ararat to the Persian Gulf. This survey he might say, *en passant*, was one of the most valuable and important geographical works which had been undertaken for a very long time past. The whole line of frontier stretching from Ararat to the Persian Gulf, together with a considerable extent of territory on either side, had been minutely and scientifically surveyed by English and Russian officers, under the direction of Sir Fenwick Williams on the part of the English government, and of General Tcherikoff on the part of the Russian government. The sketch-map hanging on the wall merely exhibited the result of that great survey, the details of which were, he believed, now being again put together at Constantinople, after an interruption of some years caused by the war which took place between Turkey and Russia. The line of frontier, they would perceive, ran down here, from the extremity of the mountain-range to the sea. He must explain that the physical law which was held to regulate territorial distribution between Persia and Turkey in this quarter was, that the country watered by the Euphrates belonged to Turkey, and the country watered by the Karun belonged to Persia. Moham'rah was here. The great Persian river Karun came down in that direction from the north-east, while the Shat-el-Arab, formed of the Tigris and Euphrates joined together, came down in this direction from the north-west. The question was, then, whether Moham'rah was on the Euphrates or on the Karun? If on the Karun it was Persian; but if on the Euphrates it was Turkish. After a great deal of discussion, all the *pros* and *cons* being given in the report which he held in his hand, it was decided that it should be Persian. This decision he believed to be contrary to geographical propriety; but nevertheless it might have been a proper decision in a political point of view; in fact, if it had not been so ruled, and Persia had not been encouraged to consolidate her position on the lower Euphrates, we should not have been able at the present day to have exerted that pressure upon her

in the occupation of Moham'rah which it might be hoped would now definitively put an end to the war. If we took geographical precedent, he believed it could be shown that Moham'rah was certainly on the Euphrates; and if on the Euphrates, it most unquestionably belonged to Turkey: the reasons for this geographical distribution he should be able to show when he read his notes on the ancient history of Moham'rah. Extracts, which he should give from Arab geographers, who were perfectly well acquainted with the country, would demonstrate that the Euphrates came to this point and bifurcated here; that this was the eastern branch of the river, called the Bahmeshire; that this, up which the fleet passed, was the western branch: that, in fact, the Euphrates discharged itself into the sea by a delta formed of these two channels; and that the Karún was afterwards brought in through an artificial bed and joined the Euphrates at this point. However, it had been ruled by the Treaty of Erzerum, that Moham'rah was in Persia, and so it would now remain to the end of time. The reason for this settlement assigned at the Conference, was that Moham'rah had been occupied by the Persians for some fifteen or twenty years previously, and that it would be inconvenient to disturb the existing distribution of territory. He might further observe, although it was more a political than a geographical question, that the Turkish government had never been satisfied with this adjudication. In fact, within the last six weeks, when it was known that a British expedition was preparing to attack Moham'rah, the Turkish government entered a formal protest against the movement, stating that although they had agreed to the treaty of Erzerum, which required them to surrender the left bank of the lower Euphrates, yet, as other geographical conditions of that treaty (referring probably to Zohab and Kotur) had not been carried out, they did not consider that they had in the mean time lost their territorial claim to Moham'rah; and that, until that claim was waived, no foreign power had a right to attack the place. A troublesome discussion might have arisen on this point had not the Persians who were in possession of Moham'rah fired on one of our steamers, the 'Comet,' whilst passing up the Euphrates; and thus disposed at once of the protest and the pretended neutrality; because if the Turks had any claim upon the place, they ought to have been able to prevent parties in possession of it from taking the initiative in an attack upon us. The last accounts stated that an answer to the above effect had been given in to the Turkish government, and that, immediately afterwards, the expedition entered the river, sailed up, and attacked Moham'rah.

Having thus given a popular account of the geographical position

of Moham'rah, and of the respective claims upon it by Persia and Turkey, he thought he might pass on to the second portion of his subject, and read his notes on the ancient history of the place; after which he should feel himself more at liberty to discuss any general matters relating to it. He might explain that these notes, written off hurriedly, and merely referring to the ancient geography of the country, could not be expected to excite much interest; but there were two points contained in them to which he particularly wished to direct attention. One was the evidence they afforded of the whole of the country at the mouth of the Euphrates being new. He should be able to show that the great capitals of the country at the commencement of history were far up the river, about here and that century after century, with a fresh accretion of land, a fresh emporium was formed lower down the Euphrates, until we descended to the present day, and saw successive villages rising, one after the other, as the sea receded, and new lands were available for cultivation. That was one point. Another matter to which he desired to draw attention was, that this particular district of Moham'rah was, some 2000 years ago, the seat of a very famous Greek, or quasi-Greek kingdom. Although the present village of Moham'rah might not exactly occupy the site of the old capital, still the country dependent on it formed the kingdom of Characene, which was of much political importance in its day, and the Greek coins of which were still in great request among antiquarians.*

If the meeting would allow him he would say a few words with regard to the modern question, and endeavour to introduce them to a better acquaintance with Moham'rah under its present aspect, and with the surrounding country. They knew exactly where Moham'rah was situated, and before he proceeded farther, he would give them some information as to the condition and appearance of the modern town.

Sir Henry then read an account of the fort from his notes, and explained the reasons which influenced Sir James Outram in selecting Moham'rah as his point of attack. So long as he remained at Bushir he could only act on the defensive. He could not proceed inland or adopt any offensive measures for two very sufficient reasons; firstly, because he had no carriage, and secondly, because the passes which barred his progress were impracticable to an army. To have remained therefore in position at Bushir would have been a mere idle demonstration, leading to no result; yet Sir James Outram, it must be remembered, had no reason to suppose

* Sir H. Rawlinson here read his notes on the Comparative Geography of Moham'rah and the vicinity, which will be published in due course in the Journal.—Ed.

that a treaty would be concluded at Paris, or that the war would speedily finish. Anticipating a sustained resistance on the part of Persia, his object was to obtain a certain position, which would enable him to carry on the war with vigour and effect hereafter; and for that object it was absolutely necessary that he should, in the first instance, secure a strategic base. Such a base then he rightly judged to be only obtainable at Moham'rah, where the obstacles which impeded operations at Bushir would no longer require to be encountered. At Bushir, there were not only the passes to contend with but there was also a deficiency of carriage, and the latter difficulty appeared insuperable, for there were no camels in that part of the country, and if mules were obtained in sufficient quantities, they would require a corresponding amount of forage, which the district about Bushir was quite inadequate to supply. But at Moham'rah the General would be able to draw camels to any extent from Turkish Arabia, for the whole country teemed with them, and, moreover, in regard to the physical character of the region, the army could ascend the country up to the foot of the mountains without any difficulty whatever. He did not *know* what Sir James Outram's ultimate intentions had been, but that commander, he thought, probably saw that by obtaining command of the country up to Shuster, or to the base of the mountains, he would really make a great impression upon Persia—such an impression indeed as in all probability would bring the Persian government to reason. If this expectation had not been realized—if the Persians had still held out, whether Sir James Outram, in prosecution of the war, would have attempted to penetrate still further into the interior, was a matter which there was fortunately no occasion to investigate. His own idea was, that Sir James Outram would have found it extremely difficult to advance beyond Shuster and Dizfúl. But in Oriental countries experience had shown that we might always safely count on the enemy succumbing to moral pressure before there was any real necessity, and the result of the Persian war afforded no exception to the rule. At the same time it should be understood that it was not absolutely impossible to enter Persia from Moham'rah. There were several caravan routes leading to the interior of more or less difficulty. One route which had been traversed by many Europeans, led from Khuzistán, by Ram Húrmuz and Bébahán, through the mountains to Shiraz. It involved of course an enormous circuit, instead of passing direct from Bushir to Shiraz, to go by sea in the first instance from Bushir to Moham'rah, and then by land from Moham'rah to Shiraz. But still the line in question had been considered as a possible

means of entry into Persia, being the same which was followed by Alexander in his march from Susa to Persepolis. The direct road across the mountains from Shuster to Ispahan, he pronounced to be absolutely impassable for our armies, encumbered as they were with "matériel" of war; it was with difficulty that a laden mule could traverse the ranges; therefore to talk of transporting our artillery and ammunition, stores and baggage from one point to the other, was simply absurd. Again, there was a line running due north from Dizful to Búrújird, passing along the precipitous banks of the Dizful river, but that was still more difficult than the Ispahan route, and was in fact little better than a sheep track. Then there were two other lines which he had himself followed, leading from Dizful into the interior. One went direct over the hills to Khorremabad—it was badly supplied, and was, he thought, impassable for troops. The other line led up the valley of the Kerkha to a certain point called Jaedur, where it bifurcated, one route branching off to the east to Khorremabad, and the other proceeding due north to Kermanshah. The last named line was just passable: it was difficult, but still it could be traversed by troops; and if the war had been prolonged, and General Outram had desired to penetrate into the interior from Khuzistan, he would in all probability have been obliged to follow up this difficult and circuitous line to Kermanshah.

The observations he had thus made referred however only to contingencies; he had merely been speculating on what might have happened if the war had been continued. At present it would be more interesting perhaps to explain what had actually taken place, or, at any rate, what might be supposed to have taken place in regard to the movements of the expedition. He had explained that General Outram left Bushir on the 19th, and that he attacked Moham'rah a week afterwards, on the 26th of March. Upon the plan suspended on the wall were marked the exact positions of all the Persian batteries, showing how the enemy had proposed to defend the entrance into the Moham'rah creek. One battery was at this corner, another was placed a little further on; and a third occupied the opposite corner; the fire of the three batteries concentrating at one point. Here, in the middle of the Euphrates, was a shoal which prevented a vessel of any size from clinging to the right bank of the river, and thus passing to the north of the creek. But the ships of the expedition, with their heavy guns, must have destroyed the batteries in a very short time, and as the information previously received from the spot stated the Persian troops to be all ready to retire, immediately the guns were dismounted and our troops were prepared to land, he inferred that such had been the actual result

of the attack. The Persians appeared to have retired as fast as they were able from Moham'rah immediately we landed, and to have never halted till they reached Ahwaz, where they were overtaken by a flotilla of small steamers and again dispersed.

Now the object of General Outram in taking Moham'rah was, as he had before stated, to obtain a strategic base, in order to be enabled to advance with safety into the country. His reasons for thus desiring to advance into the interior were three-fold. In the first place a general had to provide, as far as he was able, for the health of his troops. A consideration of not less importance was to make arrangements for feeding them, and in the third place it was desirable to locate the troops in a strong military position. These three objects then could only be obtained by advancing up the river from Moham'rah. Had General Outram remained at Bushir he could not have fed his troops at all; the cavalry at any rate must have starved; and again, if he had remained at Moham'rah after taking it, the troops would have suffered dreadfully from the climate, for notwithstanding that the place was supposed by some to be the site of Paradise, it was in reality about the most pestilential spot in the whole Eastern world. When the Frontier Commissioners, General Williams and General Tchirikoff, were encamped at Moham'rah in the spring of 1851, there was not, he believed, a single individual of their party who was not put *hors de combat* at one time or another from fever. Three years ago he remembered that the Persians had sent 500 men to garrison Moham'rah during the summer, and when relieved in the autumn only 100 men had marched out of the place. That, however, it must be admitted, was considered a bad season, but under ordinary circumstances the yearly mortality was about 50 per cent. The cause of this unhealthiness was the marsh malaria produced by the decomposition of vegetable matters under a burning sun, added to the great humidity of the atmosphere in the immediate neighbourhood of the sea. But on proceeding up the river, although the heat continued to be great, the climate was comparatively healthy. The heat, he must repeat, was extreme in this country of Susiana, and always had been so. Strabo mentioned on the authority of one of Alexander's generals, who had visited Susa, that the snakes and lizards could not pass across the streets from one side to the other without being burnt up. That story, whether intended to be taken literally or not, would at any rate give an idea of what the Greeks thought of the heat of Susa. He could not say that he had experienced quite the same degree of heat, but still it was undoubtedly very trying; he had remained in Susiana up to the end of May, or

about a fortnight after the great heats had fairly set in, and at that time the thermometer used to rise daily to 130° in the up-stair rooms, obliging him, in common with the rest of the inhabitants, to take refuge in subterranean caverns excavated in the solid rock 40 or 50 feet below the surface. The population of Shuster and Dizful, during the great heats, thus lived almost entirely under ground. But from that place (Dizful), in two days, he got upon the snowy mountains and enjoyed a most delightful climate. As our troops would have to remain in Persia through the summer, the treaty providing that they should not retire until three months after the ratification, which would take place early in the month of June—and June, July, and August being the three worst months in the year—he could only hope that the General would not remain at Moham'rah, but would take up a position in the interior of the country, either at Ahwaz itself, or at any rate half-way between Moham'rah and Ahwaz, beyond the reach of the malaria. In such a position, if the troops were well hutted, and the huts were surrounded with camel thorn, the temperature could be reduced to quite a bearable point. In fact when the thermometer at Baghdad in the shade had been 125° or 130° , he had seen in houses of this sort, surrounded with camel thorn, and constantly watered to produce evaporation, the temperature reduced as low as 80° , and with ordinary care the thermometer would never rise above 90° . He, accordingly, hoped that General Outram would take these precautions and canton his troops on the river, either at Sabla or Ahwaz, where the dryness of the atmosphere was peculiarly favourable to evaporation, such as he had described. With regard to food also, the whole of this province of Susiana at the present time was one mass of the most luxuriant vegetation. There was probably no country in the world richer than the neighbourhood of Shuster. The river Karun, above Shuster, was divided into two branches, which joined again about thirty miles below, and the country between the two arms reticulated with canals, and cultivated throughout, presented the aspect of one continuous garden, and yielded all sorts of tropical productions, some of which he might enumerate. In the first place there was a vast quantity of sugar-cane, and the manufacture of sugar had always been carried on, it would seem, to a great extent in the province, one of the classical epithets of the article in Persian poetry being derived from a city in the vicinity of Shuster.* Then there was a considerable cultivation both of opium

* The allusion is to the *Kend-i-Askert*, or "Sugar of Asker," so called from the city of *Asker-i-Mohrim*, of which the ruins are to be seen on the left arm of the Karun (the *Masrukán* of the geographers), a few miles to the north of *Bend-i-Kir*.

and indigo, the latter of which products it had been stated not long ago in that room, would only grow in India; he would not say that the Shuster and Dizful indigo was of first-rate quality, but it was sufficiently good for the ordinary uses of the country; and he might add that one-fourth of the opium used in Persia was said to be grown at Shuster and Dizful. There were also produced in Khuzistan and the adjacent districts, rice, cotton, madder, cherry-sticks, gall-nuts, and especially mules and horses and wool. So that it would be seen that the province of Khuzistan was not only valuable in a military point of view, but also in a commercial one, and although at the present time there was no idea, he believed, of our retaining permanent occupation of the province, still the Persian government must be equally aware with us, of its value, as well as of its being entirely open to our arms, and these combined considerations would, of course, act as an inducement for them to get us out of the country as quickly as possible by agreeing to our terms.

He had only further to point out that the province in which Moham'rah was situated was so oppressively hot in summer that the governors never ventured to remain there during that season. All the provinces of Persia were under the rule of Prince governors, members of the Royal Family being sent from the court of Teheran to administer the several divisions of the empire, but no special governor was ever appointed to this province to remain there permanently. Khuzistan (or Arabistán, as it was now generally called) was placed under the rule of the governor of some other province. It was sometimes attached to Kermanshah, sometimes to Ispahan, and occasionally to the subordinate governments of Khorremabad or Búrújird. At present it formed a part of the government presided over by Khanler Mirza, the Prince who had been defeated by our troops at Moham'rah, but he merely came down to collect the revenues, and inspect the government of the country during the winter, and immediately the heats came on, which was generally by the end of April, he ascended the mountains again to his capital city of Búrújird, where he enjoyed an agreeable climate throughout the summer. Our troops would not be able, probably, as he had before explained, to ascend the mountains, but they could at any rate obtain healthy quarters at Ahwaz. There was a ridge of sandstone stretching across the desert for above 1000 miles, which struck the river Karun at this point, making it impossible for a steamer to ascend higher without very considerable difficulty. He imagined that General Outram would canton his troops below this *bund*, as it was called, in order to keep up an uninterrupted river.

communication with Moham'rah, and if such should prove to be the case—if General Outram, that is, did canton his troops at Ahwaz during the summer, and there were any further affairs with the enemy, which might make it of interest to the Society to hear more of the geography of the upper part of the river, he should be happy on a future occasion to communicate what he knew.

The PRESIDENT was glad they had returned thanks so heartily to Sir Henry Rawlinson for his remarkable communication. Sir Henry had the advantage of being a great critical scholar, of having accurately studied, not only the histories of ancient times, but of having compared all these sites, so famous in ancient history, with their actual condition in the present day. He really came before them as an antiquarian, as a physical and, he might say, a political geographer, and that last feature in his character had perhaps most interested the Society upon the occasion. For his own part, he would not dwell one moment upon the very valuable communication which had been offered to their consideration.

GENERAL MONTEITH, F.R.G.S., said, when he was in the country, it was then a doubtful point whether Moham'rah belonged to Persia or Turkey. It was after the mission to which he was attached had finished their labours that the Persians took possession of Moham'rah. The Sheik of Chaab possesses lands in both Persia and Turkish Arabia, and never paid tribute without being coerced. Mahomed, the great Sheik, dug a canal from the Karun to the Persian Gulf, to avoid paying the customs to Turkey. The mouth of the canal was still open near the small village of Sabla. He also constructed a bund which was broken by Kerim Khan after his capture of Busrah. The temperature of the Karun in summer is 20° lower than the Euphrates. General Monteith next spoke of the physical features of the country, and, with reference to the Karun, stated that in ascending that river to Ahwaz he met with the remains of a sluice, which, if a lock were made, would afford communication as far as Shuster. Respecting the passage into the interior, General Monteith said the route from Shuster to Disful was over a beautiful country, perfectly easy for artillery or anything else. But the march from Shuster, which was the line followed by Alexander, offered obstacles still more difficult than the passes to Shiraz. For a distance of 90 miles the country was destitute of water. From Ahwaz it was 64 miles across a desert, till you came into the valley of Ormuz; then, from that point, you might pass on, without any great obstacle, to the beautiful valleys of Sir-ab-Sea and Fallian, than which nothing could be more lovely, nothing more delightful than the climate. But here was a pass fully as difficult, if not more so, than any of the passes between Shiraz and Bushir. He surveyed the passes between Bushir and Shiraz, and, with some labour, he thought they were capable of being made passable for artillery, provided possession were taken of the heights, which must be done by whatever pass is taken.

MR. CRAWFORD, F.R.G.S., had only to make a short explanation respecting what passed the other night upon the indigo question. Sir Henry Rawlinson fancied that he considered indigo the sole product of India. That was not what he intended to convey. All he meant to say was, that, of all parts of Asia, India was the only country in which a marketable indigo could be produced. He ventured to say that the Bussora indigo would not fetch sixpence in the pound in the London market, while the indigo of Bengal and of Guatemala would fetch five and six shillings. He should like also to ask Sir Henry Rawlinson, what he thought could induce Alexander the Great to plant Greek colonies in such a climate as had been described, or how he could bring himself

to believe that Greeks would thrive with the thermometer at 130° in the shade?

SIR H. RAWLINSON replied that the Greek settlement at the mouth of the Euphrates was a well known historical fact. Alexander not only planted a colony at the head of the Delta, but he gave to the surrounding tract of country the name of Pellaum, after his native village Pella, in Macedonia. He presumed the object to have been one of national glory rather than a mere consideration for the comfort of the Greek soldiers; Alexander cared little perhaps whether the settlement thrived or not, but that he did fix a colony in the vicinity of the modern town of Moham'rah was certain. We had further the evidence of the coins, struck in Characene with Greek legends and Greek dates, to prove that the colony must have continued, under Arab or Partho-Arab kings, to exist at the mouth of the Euphrates for several hundred years. As to the doubt expressed whether Greek colonies could thrive in the great heat of that country, he could not help referring to the remarkable case of Seleucia, where the heat must have been fully equal to that of Moham'rah, the town being situated on the upper part of the Tigris, about 20 miles below Baghdad, but which, nevertheless, contained a Greek population of 100,000 souls, among whom Greek arts and literature were cultivated almost as ardently as in Europe. Some of the most interesting descriptions that we possessed of Greek society occurred in Plutarch's notice of Seleucia, under the Parthians (after the defeat of Crassus), with reference to the acting of the plays of Euripides in that city before an audience composed of Greeks and Parthians. It was well known indeed that the Greek cities of the East flourished quite irrespective of climate or of European comforts. He supposed that the Greeks did deteriorate, as Englishmen also deteriorated in India. But whilst we had an Indian empire, administered by resident Englishmen, we need not wonder at the establishment and maintenance of Greek colonies in the countries situated on the Tigris and Euphrates.

MR. MONTGOMERY MARTIN, F.R.G.S., said it would be interesting to know the declination of the country from Moham'rah to the northward? what was the nature of the soil, as regarded its salubrity? and how far Sir Henry Rawlinson thought our gallant soldiers would be able to sustain four or five months' residence in that country, without the loss that would arise from the extreme heat? Because the extreme heat was not always destructive of life. When he was at Aden, where the heat was intense, the mortality in the 17th was only 3 per cent.

SIR HENRY RAWLINSON could only make a few general remarks upon the sanitary question, because he had not examined the country between Moham'rah and the mountains with that especial view. He only knew the sanitary effects practically and from general observation. Near the sea there was an extensive marshy region, where the climate was most deadly, owing to the malaria which was engendered, he supposed, by the constant decomposition of vegetable matter in a tropical sun. But when this marshy region was once passed, the country was perfectly dry, the rivers remaining in deep beds in their course, and never flooding the adjacent lands. No rain fell except in the spring, at which period the whole country was covered with a most luxuriant and wholesome vegetation, principally rich, thick grass, which he had no doubt would be mowed by our troops and turned into serviceable hay. In April and May the grass on the banks of the Kerkha and Shaver rivers was so thick that it was difficult to force a horse through it; and such was the case all the way up to Shuster and Dizful. There was comparatively little irrigation in the plains of Susiana. The desert was chiefly watered by the rains of heaven. All this country was, of course, originally formed by alluvium, that is, by detritus from the mountains. The rise from the sea to Shuster, near the foot of the hills, was probably 1½ foot per mile, so that the base of

the mountains might be about 400 feet above the level of the sea. But from that point the mountains rose abruptly, and, as he had already mentioned, on the second day after leaving Dizful he entered into the region of snow. The whole of the upper country, that is, between the marshy belt to the south and the mountains to the north, was healthy, although there was a good deal of heat during the summer months. But we had had experience of this heat in our former expedition to the Gulf when we occupied Karak. At first there had been great mortality, because the European soldiers were lodged in tents and were placed on sentry in the sun equally with the natives. It thus not unfrequently happened that a European soldier on guard was struck down by a *coup de soleil*, and that the party from the regiment sent out to bring in the man and place another sentry, lost two or three men from the same cause before they returned. The European authorities accordingly soon came to the conclusion that it was necessary to place natives only on sentry; and as the Europeans were shortly after lodged in huts of palm-mats and otherwise well cared for, it was found, before we had been a year on the island, that the mortality was not greater in Karak than it was in any of the warm stations of India, such as those in the north-west provinces. He felt satisfied if the same precautions were now adopted at Ahwaz, with the additional advantage of using wet screens made of camel-thorn facing the hot wind, which naturally produced evaporation, that the troops would not suffer more from the heat than in the north-west provinces of India.

A VISITOR, in reply to Mr. Crawford's statement that Bengal and Guatemala were the only countries which produced indigo, stated that Guatemala did not produce an ounce of indigo; it produced only cochineal.

MR. CRAWFURD presumed that indigo must have been manufactured in Guatemala, because it went under that name. He did not know into what particular parts of America the manufacture had been extended.

THE PRESIDENT, in closing the discussion, reminded the Society that the next meeting would be their Anniversary. The Society had so rapidly increased—numbering at present nearly a thousand Fellows—that the Council had to look out for a larger place of meeting. Various propositions had been made, among which was one that he, the President, should represent the case to the Earl of Granville, as the head of the Board of Education, and request permission to hold the meetings of this Society during next session in the theatre of the Government School of Mines, in Jermyn Street. If it should be the pleasure of the Society, as it was that of the Council, he was quite ready, as Director of that establishment, to apply to the proper authorities on behalf of the Royal Geographical Society.

The resolution was unanimously passed.

SIR GEORGE BACK next said that the Geographical Society had now arrived at that period when it was customary to make some changes in the Council. Those changes had been proposed that day in the Council, but one important omission had occurred—that of nominating the President for the ensuing year. They would all remember that Sir Roderick Murchison, on the demise of the late lamented President, Admiral Beechey, accepted the office with an understanding that it should not extend beyond the regular time, and the able manner in which he had fulfilled the duties was patent to all. Everyone knew his courtesy, and most of them had partaken of his hospitality. Indeed, he knew no gentleman who could have conducted the affairs of the Society more efficiently than Sir Roderick Murchison had. He appeared to be in such admirable health, and to have thriven so much upon the work, that with their permission, he would propose that Sir Roderick Murchison be President for the ensuing two years.

COLONEL EVEREST having seconded the proposition, it was carried unanimously.

SIR RODERICK begged to assure the Society that when he took the Chair, on the demise of his lamented friend Admiral Beechey, he said with all sincerity, that he did not feel that he could efficiently carry out the duties beyond this Anniversary. Having found that with the work, he had thriven, as it were, in health, he was ready to continue his services, if the Society thought him worthy of it. He could only say that, if he should be elected at the next Anniversary, he should consider it the highest honour that could be conferred upon any scientific Englishman ; for he should then have entered into his third Consulate, *i. e.* his third Presidency ; and, if he lived to a future Anniversary, he should have delivered six Addresses to the Society, all of them infinitely too long, but all prepared with the greatest pleasure—a pleasure the greater, if he could believe that they had conduced, in the slightest degree, to the advancement of geographical science.

PRESENTATION
OF THE
ROYAL AWARDS

TO

MR. AUGUSTUS C. GREGORY, THE EXPLORER OF NORTH AUSTRALIA; AND LT.-COLONEL ANDREW SCOTT WAUGH, DIRECTOR OF THE TRIGONOMETRICAL SURVEY OF INDIA.

THE President opened the Meeting by making the following statement of the grounds on which the Council had awarded the Medals:—

The Founder's Gold Medal has been awarded to Mr. Augustus C. Gregory, for his extensive and accurate surveys in Australia, and particularly for his last great and successful exploration of North Australia and his journey thence, or from the Victoria of Stokes to the Colony of New South Wales, as recommended by the Royal Geographical Society, and carried out under the orders of Her Majesty's Government.

When Her Majesty's Government decided that an exploration of North Australia should be made upon the general plan advocated by this Society, and in accordance with the suggestions of our members Stokes and Sturt, they wisely selected so experienced an Australian surveyor as Mr. Gregory to carry out this great and important project. That gentleman was already well known to us by his successful labours in unravelling the condition of the interior of Western Australia, as recorded and mapped in the 18th and 22nd volumes of our Journal. In the first of these journeys (in 1846) he ascertained that the inner part of that colony is generally flat, broken here and there by low hills of granite or other igneous rock, the depressions being usually occupied by salt lakes or marshes, no fresh-water streams having yet been detected. In 1848, Mr. Gregory proceeded from Perth on what was termed "the Settlers' Expedition," or an endeavour to discover a tract of good

land in the latitude of Champion Bay, and, if possible, to penetrate to the Gascoyne river, which falls into the northern part of Shark Bay. Crossing the Moore and Arrowsmith rivers, he ascended the Murchison, for 50 miles towards its source, and found some rich soil on its banks. Determining everywhere his positions astronomically, he proceeded to the affluents of that stream and made ineffectual efforts to force his way through the dense brush or scrub of the waterless, arid plains south of Shark Bay; when the exhaustion of his horses, great heat, and the sterile sandy soil proved to him that the interior of the colony could only be explored in the moist winter months. He therefore returned to Perth, having travelled about 1500 miles without detecting any notable quantity of good land, and having failed in reaching the Gascoyne river, from the want of fresh water and the impenetrable thickets of scrub.

Most of the officers of the last and great expedition, which we had so long advocated, having been sent from England to Sydney, the expedition was there placed under the orders of Mr. Gregory. Being properly fitted out under the directions of our associate Sir William Denison, the Governor of New South Wales, and proceeding thence by sea through Torres Strait and along the north coast of the continent, it reached the great bay, first made known to us by Capt. P. King in 1819, the eastern gulf of which, or Queen Strait, and its stream the Victoria, were explored by Wickham and Stokes in 1839.

Having ascended the Victoria, with the schooner *Tom Tough*, as far as was practicable, Mr. Gregory established a camp on the right bank of this stream, at about 80 miles from its mouth. With his brother, Mr. H. Gregory, Mr. J. S. Wilson the geologist, and Dr. Ferdinand Mueller the botanist, he then explored the Victoria to Jasper Creek, determining the geological nature of the country, and ascertaining that the river made a great southward bend. Again taking with him his brother, and Dr. Mueller, together with the artist, Mr. T. Baines, he marched southwards to ascertain if the saline desert, which Sturt had discovered in proceeding inland from the southern regions of Australia, and which he had himself found to prevail in Western Australia, was also to be met with in a journey southwards from the north coast.

For this purpose he ascended the Victoria to its source, and found the hilly or dividing range to have an altitude of 1660 feet above the sea. Traversing this watershed, he descended by a

stream flowing south, which he named Sturt Creek, and which, bending to the S.S.W., terminates in a desiccated salt lake near Mount Wilson, in S. lat. $20^{\circ} 2'$ and E. long. $127^{\circ} 5'$. Whilst the south-eastern and southern slopes of the dividing range were thus proved to be everywhere dry and sterile sands, the whole of the territory to the north of the same presented the most striking contrast, being generally fertile in grasses, particularly the extensive grounds named Hutt Plains and Roe Downs.

In this first effort, therefore, made specially by the advice of our medallist Sturt, the grand geographical and statistical feature, which was suspected to exist, was brought to the test; and we may now fairly infer, that all the central portion of this continent, as well as the long southern coast-line examined by our associate Eyre, and a considerable maritime frontier of Western Australia, constitute an uninhabitable desert, probably the dried-up bottom of a sea, and that hence all future intercourse between our Australian colonies must take place either along the fertile coast ranges, or by sea.

Returning to his camp, which he had left under the charge of Mr. Wilson, who had in the mean time examined the adjacent country, of which he sent home a sketch map to this Society, Mr. Gregory sent away Mr. Baines, with Mr. Wilson, and the larger number of his party, in the schooner; and after giving directions that the vessel should meet him at the head of the Gulf of Carpentaria, he set out on his chief mission, accompanied by his brother, Mr. Elsey the surgeon, Dr. Mueller, and three men.

Quitting the basin of the Victoria, and passing over a broad table-land of sandstone, he entered a valley watered by a tributary of Leichhardt's river, the Roper, which he named Elsey Creek, in S. lat. $15^{\circ} 15'$ and E. long. $133^{\circ} 10'$. He next took a south-south-easterly direction to the west of Leichhardt's route, or about 70 miles distant from the western shore of the Gulf of Carpentaria, and traversed the various rivers discovered by his adventurous precursor (but nearer to their sources) until he reached the Albert, which empties itself into the head of the Gulf. Not meeting there with the party sent by sea, under the orders of Mr. Baines, he left the 'Plains of Promise' of Stokes, and crossed the river Flinders at about 80 miles distance from the Albert, and, journeying to the north-east, fixed a position on the Gilbert River at S. lat. $18^{\circ} 0'$ and E. long. $140^{\circ} 40'$. Ascending that stream, Mr. Gregory left behind the drainage into the Gulf of Carpentaria, and traversed the high basaltic plateau which separates the waters flowing into that gulf, from those which

descend into the great eastern ocean. To the dividing high lands he assigned the name of 'Newcastle Range,' in honour of the Secretary of State for the Colonies, who had sanctioned the expedition. Reaching the Burdekin, he followed that stream south-eastwards to its junction with the Cape river of Leichhardt.*

The next march showed the connection of the Suttor of Leichhardt with the Belyando of Mitchell; then striking south-west from the latter stream, Mr. Gregory skirted the Peak range, the extreme point to which squatters have extended their dwellings, *i. e.* in S. lat. $23^{\circ} 41'$ and E. long. $147^{\circ} 50'$, or about 560 miles from the head of the Gulf of Carpentaria.

Whilst a great breadth of entirely sterile tracts, with only one insulated rich spot on the river Roper, prevails between the basin of the Victoria on the north coast and the Gulf of Carpentaria, with occasional poisonous plants, Mr. Gregory found nearly all the vast region between the eastern side of the gulf and the northernmost station of our settlers, to be more or less fertile. During the last weeks of the expedition the horses fattened, and after traversing the rivers Mackenzie, Comet, Dawson, and Burnett, the party reached the Brisbane and Moreton Bay in excellent health.

The value of the researches of Mr. Gregory and his associates cannot be appreciated until all their records, and the general map, now in course of compilation by Mr. Arrowsmith, shall have been published; although we already know how vastly our acquaintance with the geographical distribution of plants has been enlarged by the collections of Dr. Mueller.† In the mean time, however, the geographers of all countries will admit that we have rightly awarded our Founder's Gold Medal to the successful explorer of such vast unknown lands, through which his united journeys have amounted to upwards of 6500 miles, and in making which he has determined many points of longitude as well as latitude, and has accurately defined the character of a fine basin of North Australia, which may probably, at no distant day, become a British colony,—a subject which will be particularly alluded to in the discourse which follows.

* It is my pleasing duty to state a fact which is in the highest degree creditable to Mr. Arrowsmith. That acute and indefatigable geographer, without any other guide than his own comparison of somewhat discordant materials, had placed upon his map the point of the confluence of the Burdekin and Cape Rivers, or Mount McConnell, at not more than ten miles in error of the precise longitude, $153^{\circ} 50'$ E., determined by Gregory; for the latitude only had been fixed by Leichhardt, *viz.*, S. lat. $26^{\circ} 30'$.—R. I. M.

† See Sir W. Hooker's Journal of Botany.

The President, having read the preceding grounds of the award, rose, and thus addressed the Right Hon. Henry Labouchere :—

“ Mr. Labouchere,—Having taken for many years the liveliest interest in the exploration of North Australia, it has been peculiarly gratifying to me to see this very difficult operation effectually carried out by a surveyor of the Australian colonies, so admirably qualified to ensure success as Mr. A. C. Gregory.

“ On this memorable occasion I rejoice that you, Sir, her Majesty’s Secretary for the Colonies, under whom this great task has been happily terminated, should have honoured us by attending here to receive for the explorer of North Australia the Founder’s Medal of our Society, which I request you to transmit to Mr. Gregory with the expression of our entire and hearty approbation of his conduct.”

Mr. Labouchere replied :—

“ Sir,—It affords me sincere pleasure on this occasion to receive, on the part of Mr. Gregory, this well-merited mark of approbation of the Royal Geographical Society. That gentleman had been selected by the Government for the arduous and important task of exploring the vast regions yet unknown to civilized man in North Australia, and the manner in which he has performed it has amply justified the selection.

“ Of Mr. Gregory’s scientific qualifications it would ill befit me to speak before such an audience, but I may advert to those moral qualities which were not less necessary to an explorer of those vast solitudes. Sir William Denison, in a despatch which rendered a high testimony to the merits of Mr. Gregory, observed that it was to his prudence and courage that the safe return of the entire party was probably due.

“ You have called attention, Sir, to the description which Mr. Gregory gives of the soil and climate on the banks of the Victoria river ; and, indeed, it is of such a nature that it is no extravagant supposition that some of us may live to hear of that hitherto unknown region becoming the home of a prosperous English settlement.

“ Such anticipations have always been a source of great gratification to my mind ; for I believe that, among the many blessings and advantages which have been permitted to this country, none ought to be ranked higher than, that she should have been enabled to scatter so widely over the globe the manners, the freedom, the civilization, and the religion of Englishmen.”

Mr. Labouchere concluded by assuring the Meeting that he would transmit the medal which he had received from the hands of their distinguished President to Mr. Gregory, who, he was sure, would highly value such an honour.

The President then continued :—

The Council has adjudicated the Victoria or Patron’s Gold Medal

to Lt.-Colonel Andrew Scott Waugh for his valuable and able extensions of the Great Trigonometrical Survey of India, and particularly for his recent triangulation carried on through Rajputana, the Panjab, and the Himalayan Mountains, thereby adding to our geography an accurate and intimate knowledge of a part of the globe most interesting to mankind at large, and of vital importance to Great Britain in particular.

This Trigonometrical Survey of India was commenced by Colonel Lambton in 1803, and continued by him till his death in January 1823. During that period he measured an arc of the meridian from Punnae in $8^{\circ} 9' 35''$ near Cape Comorin to Damargidda in lat. $18^{\circ} 3' 16''$, being about ten degrees of latitude, and extended a net of triangles over the south part of the Peninsula of India, reaching on the east side of the principal meridian to the 19th parallel. Colonel Everest, who had been his chief assistant since 1817, and succeeded him at his death, completed the section commenced by Lambton, and extended the arc to Seronj, lat. 24° , near which place he measured a base of verification. This is the most important base in the Trigonometrical Survey of India, as all the work to the north, east, and west is dependent upon it. Colonel Everest carried on the measurement of the meridional arc to its completion in the Dehra Dún, lat. $30^{\circ} 19'$; the whole extent from Cape Comorin being $22\frac{1}{2}^{\circ}$ of latitude. He also extended a longitudinal series from the Seronj base to Calcutta, in the neighbourhood of which he measured a base of verification. From points selected on this series originate distinct sets of meridional series, the northern limits of which are united by a longitudinal series running along the foot of the great mountain chain, which thus completes the triangulation of that vast tract, comprising about 223,000 square miles.

When this distinguished officer left India, Colonel, then Captain Waugh, who had been his chief assistant since 1832, was appointed his successor in December 1843, and following up the admirable plan of survey laid down by his predecessor, the principles and methods of which have been described by Everest,* he worked out the several series left unfinished between the meridional arc and that of Calcutta. Finally he measured a base of verification at Sonakoda, lat. $25^{\circ} 18'$, long. $88^{\circ} 18'$, and also completed the triangulation of the south coast series from Calcutta to Ganjam.

Colonel Waugh then commenced operations on the west of the great meridional arc, and measured a longitudinal series from the

* Account of the Measurement of the Arc of India. 2 vols. 4to., 1847.

base at Seronj, passing through Rajputana and the sandy desert to Karachi, upwards of 700 miles in extent, where a base of verification was measured, whilst the triangulation of the Bombay meridian was connected with this series. He further extended another series in a north-west direction from the stations of the meridional arc, Banog and Amsot, through the plains of the Panjab and a great portion of the mountainous tract to Peshawar. Again, a base of verification was measured near Attock, the series embracing an area of about 67,000 square miles. A meridional series is far advanced from the base at Karachi, along the Indus, to that near Attock. This operation will complete a gigantic geodetical quadrilateral, of which the great arc series forms the eastern side. Simultaneously with these trigonometrical operations, most minute and elaborate topographical surveys have been executed under the superintendence of Colonel Waugh throughout the greater portion of these tracts.

Lastly, having determined that of all the mountains whence the affluents of the Ganges run, the loftiest summit is situated about midway along the Himalayan chain, and finding that this culminating point (N. lat. $27^{\circ} 56'$, E. long. $86^{\circ} 53'$) was 29,002 English feet above the sea, and consequently 846 feet loftier than the famous Kinchinjanga of Nipal, Colonel Waugh has gratefully and appropriately named this, the highest known elevation in the world, Mount Everest, after his valued geographical instructor.

These great results appear to come peculiarly within the scope of the Society, which takes for its motto "*Ob Terras Reclusas*;" for eight years ago, the mere exploration of the tracts in question would have been deemed impracticable, whereas under the direction of our Medallist, a vast portion of these countries is now accurately delineated, on the basis of astronomical observations, connected by the highest appliances of modern geodetical science and art.

The President rising thus addressed Colonel Everest:—

"Colonel Everest,—The reasons which induced the Council to adjudicate the Patron's Gold Medal to Lt.-Colonel Waugh having been made manifest by the document I have just read, I now place this our tribute to his ability and success in your hands, requesting you to convey it to your eminent associate, with the assurance that we deeply appreciate the importance of his labours.

"By transmitting this Medal, through your medium, to the officer who learnt his lessons under your able guidance, the Royal Geographical Society recognises the right of your predecessor Lambton and yourself to have had similar distinctions: and I rejoice that by

this one act, the grand Trigonometrical Survey of India should now receive a reward which it so long ago merited."

Colonel Everest replied :—

"Mr. President,—I beg to return my acknowledgments for the complimentary terms in which you have been pleased to advert to the labours of my honoured predecessor and myself, and on behalf of my esteemed successor Lieutenant-Colonel Waugh to express the warmest thanks to yourself and the Royal Geographical Society for the very proud mark of distinction which has just been conferred on him, by the award of the Patron's Medal of this year.

"The applause of our fellow men is naturally prized by us all, and nothing is more cheering to a person engaged in an arduous undertaking, replete with privations and hardships, than the persuasion that, if he endures to the end, his labours will not be unrequited. Colonel Waugh, however, is not of that stamp to need such a motive to induce him to persevere in the strict performance of his duty, and having no precedent which could hold out the prospect of such a distinction as the present, it will come on him altogether as an unexpected boon, and as such, will be additionally acceptable. I am certain that this Medal will be received by Colonel Waugh with the deepest and most sincere feelings of gratitude and respect for those who selected him for the proud honour of possessing it, and not only by himself, but by all the members of the department of which he is the chief, will this adjudication be hailed as an earnest that there is a body of gentlemen most qualified by their talents and knowledge to form a judgment, and as willing, as able to act according thereto, with right singleness of purpose. Sir, if anything could enhance the value of this mark of distinction, it is the circumstance that it has been conferred during the presidency of a gentleman of wide renown—known wherever civilization reaches—acknowledged even by our antipodes as one of the first geologists of the age, and not more distinguished by his scientific attainments than by his courtesy, urbanity, and kindness of heart.

"The Trigonometrical Survey of India has been in progress ever since 1803, a period of 54 years, and will in its entirety, embrace a tract which exceeds the area of Great Britain and Ireland in the ratio of about $12\frac{1}{2}$ to 1. Of course a vast deal still remains to be accomplished before so gigantic an undertaking can be pronounced complete; and as Colonel Waugh has now been engaged in this arduous task for 25 years, it is needless to expect much prospective effect from the present award as far as he is concerned, for his career in India must be drawing towards its close; but the memory of the present graceful act of this Society will assuredly not be lost on his eventual successor, or on India in general. He is still in the prime of life, and though he has suffered lately from more than one severe attack of illness, yet it is to be hoped that the injury which his constitution may have thereby sustained, is not greater than can be restored by a return to his native country, and that he will some day arrive to return his thanks in person to the Royal Geo-

graphical Society, and by his co-operation and counsel add fresh vigour to the active exertions of a body so effective—the first—the only learned Society in England, let me say, which has ever held out the hand of sympathy, friendship, and encouragement to the Great Trigonometrical Survey of India.

“Mr. President and Gentlemen, I thank you for having listened to me so patiently, and I conclude with my earnest wishes, that the prosperity of this Society may continue, until every portion of this globe shall have been as satisfactorily explored and as accurately delineated, as the regions under the influence of the Honourable East India Company.”

ADDRESS

TO THE

ROYAL GEOGRAPHICAL SOCIETY OF LONDON;

Delivered at the Anniversary Meeting on the 25th May, 1857,

BY SIR RODERICK IMPEY MURCHISON,

G.C.Sr.S., D.C.L., F.R.S., &c.,

PRESIDENT.

GENTLEMEN,—Having been called, through your kindness, to resume the honourable duty of presiding over you at a season, when the Royal Geographical Society has attained a condition more flourishing than its warmest well-wishers had anticipated, it is grievous to open this Address by dwelling upon the decease of my predecessor, the gallant Admiral Beechey, as well as that of my successor when I vacated this chair in 1854, the noble Earl of Ellesmere. Never since the foundation of our body has the hand of death fallen so heavily and so rapidly upon our leaders, and never has a more painful task been thrown upon your President, than that of recording the loss of two such men, however mitigated by the endeavour to do justice to their eminent and dignified characters. To delineate all their merits, even if I had the power, would be impracticable in the brief space of time to which I can lay claim on this occasion, and I shall, therefore, simply endeavour to place on record some of the salient features in the characters of my lamented friends, which more particularly connect them with the great pursuits of this useful Society.

Rear-Admiral Frederick William BEECHEY, the son of the late Sir William Beechey, R.A., was born in February, 1796, and before he reached the age of ten years was already serving as a midshipman in the Royal Navy. He bore a part in Commodore Schomberg's brilliant and decisive action off the Isle of France in 1811, and

after active employment in the expedition to New Orleans in 1815, he soon attained the rank of Lieutenant.

In 1818, public attention was again attracted to Polar exploration, which had been neglected during a lapse of forty-five years, chiefly through the exertion and energetic writings of our associate, the late Sir John Barrow. Lt. Beechey then served in the expedition under Buchan, and was appointed to the *Trent*, commanded by Franklin, who was also accompanied by Back. Having coasted the west side of Spitzbergen, they were finally arrested by heavy floe-ice in lat. $80^{\circ} 36' N.$ From some mistaken feeling on the subject, no account of the proceeding was published till 1843, when Beechey, remembering old Hakluyt's imputation on some of our early writers, who he says "should have used more care in preserving the memoirs of the worthy acts of our nation," brought out, under the authority of the Admiralty, a most interesting narrative of the voyage.

Subsequently our adventurous young officer joined the *Hecla*, and assisted the first great effort of the celebrated William Edward Parry (his former shipmate) to cut through the barrier of ice into Barrow Strait, beyond the 110th degree of west longitude, for which these officers and their companions justly received a parliamentary reward. In 1821-2 he had the good fortune to serve under the orders of our former esteemed President, Admiral W. H. Smyth, then surveying the Mediterranean, in co-operation with whose ship, the *Adventure*, he explored a considerable portion of the north shore of Africa.

During the three and a half succeeding years the sands of Cyrenaic Africa were exchanged for Pacific and Arctic researches, when, commanding the *Blossom*, Captain Beechey made accurate surveys of many islands in the Pacific, of the coasts of Russian America and of Behring Strait, of all of which he has left an admirable record in the work entitled 'Narrative of a Voyage to the Pacific and Behring Strait, to co-operate with the Polar Expedition.' In this publication, our respected President has left a record of scientific knowledge which places him high among the standard authors of our time.

To one portion of this work, which describes the exhumation of such vast quantities of bones of mammoths and other extinct mammalia from the cliffs of Escholtz Bay, in Russian North America, the late Dr. Buckland has rendered full justice.

At a later period, Captain Beechey surveyed the west coast of South America, and determined many points of high geographical

importance. Lastly, examining the shores of the Irish Channel, and performing much severe and valuable service to the detriment of his health, he produced many highly useful charts, and threw much light on the nature of the Channel tides. The result of these, his last labours afloat, was the publication of two very able and valuable memoirs in the 'Philosophical Transactions.' The first of these (in 1848) was entitled 'A Report of Observations made upon the Tides in the Irish Sea, and upon the similarity of the Tidal Phenomena of the English and Irish Channels,' &c. The principal object of the author was to point out the independence of the *set* of the *tide-current* in those seas, on the actual *state of the tide* as ebbing or flowing; and he showed, by a masterly exhibition of the facts, that there is no apparent connection between the direction of the stream and the rising or falling of the water. In addition to this, he laid down instructions for ascertaining the state of the tide, the value of which was much enhanced by two explanatory charts and many smaller diagrams.

This memoir, addressed to Sir F. Beaufort, was followed in 1851 by another letter to the same eminent hydrographer, which was written with the hope that its contents, when sufficiently known and circulated, would be the means of diminishing the number of those losses of both life and property, with which the annals of Lloyd's abound, and of advancing our knowledge of the tides, by the practical illustration of the phenomena of the tidal streams of straits under the influence of a combined wave.*

After the cessation of his arduous maritime exertions, Captain Beechey was appointed to the important post of Superintendent of the Marine branch of the Board of Trade, the duties of which he executed to the day of his death in a manner which drew from every successive Minister of the Department, the warmest acknowledgments of that clearness and precision of thought, and that skilful performance of official duty, which characterized our late President throughout his whole career.

Obtaining the rank of Rear-Admiral in 1854, he succeeded the Earl of Ellesmere in this Chair in 1856, and we all know with what sincerity he devoted his energies to the advancement of geography, how ably he directed our proceedings, and with what urbanity he presided over our meetings. Alas! I have too much reason to believe that the zealous endeavours he made to serve us, combined

* Phil. Trans., 1851, p. 717.

with the important duties of his office in regulating and improving the scientific instruction of the mercantile marine, acting on a constitution which had been sorely tried in many a clime, hastened that catastrophe which we so deeply lament.

Not long after his election to the post of President he was attacked by a severe illness, from which he only partially recovered during a summer's voyage in the yacht of the Trinity House. To that malady he feelingly alluded in the opening part of his excellent Anniversary Address—the only one he was permitted to deliver—when he thanked the other officers of our body for the effective manner in which they had conducted the affairs of the Society during his absence. On coming with his family to Tunbridge Wells in the autumn, where I happened to reside, I found that our zealous President was suffering from a disease of the heart. His affectionate wife and daughters then felt indeed, as well as myself, that the utmost tranquillity was essential to the preservation of his valuable existence; but he persisted in struggling with unflinching spirit to transact business both at the Board of Trade and in our Society. So dominant was this feeling that on Monday the 24th November, Admiral Beechey attended the rooms of this Society, and gave me, as the Vice-President he had selected to represent him, precise directions for conducting the business of the Council and of the evening meeting of that day. On Saturday, the 29th, alas! he was no more; thus exhibiting that firm resolve to do his duty to the last, which has ever been the glory of those British seamen among whom Admiral Beechey stood pre-eminent. He had long been a distinguished Fellow of the Royal Society, and was a member of the Council of that body at the period of his decease.

FRANCIS, Earl of ELLESMERE, a Knight of the Garter, Lord-Lieutenant of Lancashire, and our President during the years 1854-5, was the second son of the first Duke of Sutherland, and that gifted lady the Duchess Countess of Sutherland. He was born in 1800, and died on the 18th of February, 1857.

In endeavouring, with the approval of the Council, to induce this accomplished nobleman to succeed me in occupying the Chair of this Society in the year 1854, I felt certain, from an acquaintance of thirty years' standing, that through his varied knowledge, generous nature, and love of geography, he would render us right good service. His conduct in directing our affairs has indeed met with your hearty approval; and as we lamented that our

rules, limiting the presidential duties to two years, led to his retirement, so we have now to grieve over his demise, at the comparatively early age of 57.

Educated at Eton, and distinguished at Oxford, Lord Francis Egerton soon took a high place in the House of Commons, and served with ability both as Secretary for Ireland and Secretary at War. As he advanced in years he seemed to care less and less for political distinction; and as it is not my calling to dwell on his ministerial or parliamentary career, let me briefly remind you how he occupied many hours of his well spent life in cultivating and cherishing letters, science, and art.

I will first speak of those anonymous writings which, as they have exercised a salutary influence on society, ought to be made known, both to render justice to the man, and to indicate the great variety of his acquirements.

My auditors, who may have only known Lord Ellesmere as a member of either House of Parliament, or as our President, may not be aware that between the years 1834 and 1854 he was the contributor of not less than fifteen articles to the 'Quarterly Review;' and that about one-half of them were connected with the development of geographical research. Eschewing the troubled arena of party strife, he left no trace behind him of political acrimony even in those essays which touched upon disputed questions; whilst all of them, which did not bear upon the science we cultivate, were devoted to the fine arts, of which he was a true connoisseur, or to biography, and those military exploits which have raised the glories of Britain.

On geographical subjects he began by such attractive accounts of the works of the Dutch authors Meiglan, Fischer, and Doeff, that any one who will peruse his 'Sketches of the Manners and Usages of the Japanese' will find in them a most vivid picture of the life of that curious people, who, inhabiting a region separated from either continent, are apparently destined to remain longer an unbroken unit than the colossal empire of China. Of the Japanese he humorously wrote that he "left them to the complacent enjoyment of the conviction that they are the first of nations, and the eldest descendants of the Deity."*

Turning to the Eastern Archipelago, he has consigned to us a

* Quarterly Review, vol. lii. p. 317; vol. lvi. p. 438.

In his recent translation for the Hakluyt Society, of the Père d'Orléans' 'History of the Tartar Conquerors who subdued China,' Lord Ellesmere was largely assisted by his accomplished daughters.

memorial of the lively interest he took in that chivalrous expedition of our old associate, Sir James Brooke. After a preliminary sketch of the preceding wretched condition of Borneo, condensed from the descriptions of Sir Stamford Raffles, he painted, with the hand of a skilful master and a warm friend, all that the adventurous Irish gentleman was accomplishing. Every old member of the Raleigh Club and of this Society, recollecting the deep interest we felt in the successful voyage of the little schooner of the Yacht Club, fitted out by Mr. Brooke, will re-peruse with gratification the lines, which indicated that the young explorer of that day was destined to become the Rajah of Saráwak, and to receive not only our gold medal, but his due reward at the hands of his Sovereign.

Then, in his analysis of Arctic and Antarctic researches, Lord Francis Egerton gave long ago earnest that he was worthy to become our leader. In his review of the narrative of discoveries on the north coast of America, made by the officers of the Hudson Bay Company, in which the enterprising Simpson lost his life, we find him evincing those large views and kindly feelings which led him invariably, in subsequent years, to countenance and support those expeditions in the search after Franklin, which have shed so much lustre upon our country.

Again, when commenting in 1847 upon the memorable Antarctic discoveries of Sir James Ross and the natural history collections of Dr. J. Hooker, we see how emphatically he dwelt upon the exploits which he anticipated from our Arctic heroes when he penned these lines:—

“ With interest which accumulates by the hour do we watch for the return of those two vessels, which are perhaps even now working their way through Behring Strait into the Pacific. Should the happiness be yet allowed us of witnessing that return, we are of opinion that the Erebus and Terror should be moored henceforth on either side the Victory, floating monuments of what the Nelsons of discovery can dare and do, at the call of their country in the service of the world.” *

This was one only of the many soul-stirring paragraphs indited by my noble friend on a subject so near to his heart—one on which he never abandoned hope, as proved not only by his signing, with many of us, last year that petition to the Government, which is printed in our Proceedings,† praying for the final search of a

* Quarterly Review, vol. lxxxi. p. 167.

† Proc. Roy. Geogr. Soc., No. iv., p. 95, June, 1856.

limited Arctic area, but also by his willingly undertaking to make that appeal to the House of Lords in the last session of Parliament, which, in his unavoidable absence, was effectively made by Lord Wrottesley, the President of the Royal Society.

Among the last of Lord Ellesmere's anonymous contributions on geographical subjects, immediately preceding his two eloquent addresses to this Society,* I may advert to his lively account of Castren's Travels among the Lapps, in which he justly eulogised that enterprising Finn and his learned countryman Wallin, the successful explorer of Arabia. In other fragments of periodical literature he indicated his admiration and right estimation of engineering works in the article on the Skerryvore Light-House, and again in a very instructive Review of the progress in canalization, proceeding as it did from the inheritor of the great Bridgewater Canal.

Of his thorough acquaintance with the fine arts, Lord Ellesmere has left pregnant evidences in the pages devoted to his estimate of English artists, and to the elucidation of fresco painting. Liberally employing his wealth in making well-chosen additions to the gallery of paintings he inherited, he reared for their preservation, and for the residence of his family, that palatial structure designed by Sir C. Barry, which has scarcely a rival in our metropolis.

A distinctive feature in the character of Lord Ellesmere was his deep admiration of martial deeds. His veneration for the Duke of Wellington, founded upon a study of his campaigns, was matured by a personal intimacy of many years, during which the great Captain himself furnished the materials, which enabled our deceased President to give to the world a clear and well-condensed account of the battle of Waterloo.

The spirited sketch of the life of Blucher, the 'Marshall Vorwärts' of the Prussian soldiery, written in 1842,† was followed in 1845 by a luminous analysis of the French and English versions of the battle which decided the fate of Napoleon.‡ On these writings, coming as the chief matter in them did *from Wellington himself*, implicit reliance may be placed; and few historians, I venture to say, will improve upon the style in which the reminiscences of the illustrious Commander were conveyed to the public by our deceased Associate. In all such writings, whether he went back to the days of Wallenstein,§ or traced the struggling career of the old

* See Journal Roy. Geogr. Soc., vols. xxiii., xxiv.

† Quarterly Review, vol. lxx.

‡ Ib., vol. lxxvi.

§ Ib., vol. lxi., p. 105.

Scotch General Patrick Gordon,* who fought so well for the Czar Peter, or entered with the lamented Cathcart into the Russian and German campaigns of the first Napoleon,† or stood forth in the hour of trial as the champion of his dear friend the brave Lord Raglan, we invariably applaud the generous sentiments and true appreciation of merit which ever guided the pen in his portraiture of a hero.

The versatility of the talents of Lord Ellesmere was displayed in numerous other works published under his own name. A poet by nature, verses, whether martial, plaintive, or jocose, flowed freely from his heart, and the principal of these being collected under the title of the 'Pilgrimage and other Poems,' the author, with his habitual modesty, spoke of them in his preface as being a collection of the least unpopular of his works.

A master of several languages, he frequently put before his countrymen in good racy English, the thoughts of eminent foreign authors, and of these efforts, the translations of Goethe's 'Faust' and Schiller's 'Wallenstein' are prominent examples. The number of foreign works which he translated may well surprise us, when we reflect upon his numerous occupations, and among them I may enumerate Clausewitz's 'Campaigns of Russia,' the 'Sieges of Vienna by the Turks,' and the 'Last Military Events in Italy.'

Returning to my noble friend's connection with science, let me ask any old member of the British Association if he ever heard from the President of the year a more inciting appeal than was made by Lord Francis Egerton at the Manchester Meeting of the year 1842. Ranging from science to letters and art, he proved that he truly merited the application of that line with which he honoured his predecessor, Dr. Whewell—

“Through each mode of the lyre, and was master of all.”

It was then that I rejoiced in being one of those assembled at Manchester, to bear witness that this distinguished nobleman, the possessor of large domains, was as truly esteemed by every artisan of that vast hive of industry, as he was beloved by his tenantry and agricultural labourers.

If it was specially when surrounded by his family and friends that the genuine heartiness and wit of the man came out most strikingly, every public act of his life was carried out with such stedfast sincerity and true liberality, that, whether he presided over a Royal commission, a literary or scientific society, or a parish vestry, he did his duty with his whole heart. Philanthropy and generosity

* Quarterly Review, vol. xc., p. 314.

† *Ib.*, vol. xc. p. 1.

were to be discerned, indeed, in all his actions by those who knew how quietly and unostentatiously he sustained with his purse men of genius, who were labouring under difficulties, and who, but for his timely aid, could never have produced works which have taken a high place in science and letters.* These acts were well crowned by that full-handed munificence with which he strove to succour our famishing and ill-clad soldiers in the Crimea.

In addition to the stores of varied knowledge which he could at all times playfully and instructively draw forth from his capacious mind, there was in Lord Ellesmere a fund of cheerful benevolence which bound to him affectionately every one who enjoyed his friendship. I cannot therefore better sum up the leading merits of our former President than in the expressive words of one of his most intimate and valued companions :—

“ His calm exterior and tranquil manner covered a deep-seated enthusiasm for the honour of his country, for the progress and amelioration of his species, and for all that was grand and noble in sentiment or in action.

“ They can bear testimony to this truth who have seen him kindle over the recital of some great battle of the Great Duke, or some less famous deed of individual heroism,—who have witnessed the eager interest with which he watched the bold enterprises of modern navigation,—or who have heard his lucid and animated explanations of the mechanical inventions for diminishing labour, or perfecting manufactures, in the vast workshops connected with his canal property. While his ardent spirit rejoiced in every discovery achieved by science, and every new phase of beauty elicited by art, his accumulated knowledge and cultivated taste enabled him to appreciate the merit and calculate the consequences of each; and he was ever ready to employ the influence of his position, the vigour and liveliness of his pen, and the princely contributions of his purse for the furtherance of such purposes.

“ His high estimation and assiduous study of the science to which the Geographical Society is especially devoted, were the result of that large range of knowledge which opened his mind to its infinite relations—moral and material, social and political—with the future destinies of mankind. In him the geographer was blended with the statesman and the philanthropist, not in wild and utopian spe-

* Let me cite one of several cases known to myself. When the eminent naturalist Agassiz was likely to have the publication of his great work ‘*Les Poissons Fossiles*’ stopped for want of means, Lord Ellesmere gave 500*l.* for the original drawings, which he immediately presented to the Geological Society.—R. I. M.

culations (for the poet's imagination was controlled by a sober judgment and a jealous love of truth), but in those prescient views which result from extensive acquaintance with the physical circumstances of remote regions, and from well-reasoned calculations of their several capacities for the advancement of civilization and the increase of human happiness."*

Suffering from complaints with which he had long struggled, and aware that the climate of Lancashire was hostile to his frame, Lord Ellesmere still persisted in residing during a portion of the year in that district where he felt he had, by the will of Providence, a responsible task to perform. Raising, therefore, a beautiful edifice near the entrance of his own great Bridgewater Canal, and little distant from the town of Manchester, expending large sums in building churches or founding schools, and ardently pursuing every plan for the bettering of the moral and social condition of the people, he braved the moisture of the climate, and only succumbed when, amidst the blessings of all to whom his influence extended, he had effected the main objects for which he lived. Well might the clergyman,† who preached the funeral sermon over his bier, point, not merely to the exalted character of the statesman, the orator, and the scholar, but specially to the true Christian, the lamented Lord of Worsley Hall, in whom all the surrounding inhabitants felt that they had lost the generous patron, the liberal, indulgent master, the charitable and tender-hearted soother of distress and poverty.

In short, as it was impossible to know him well and not to love him, so the deep sorrow which his death called forth is the noblest monument to the memory of the good Earl of Ellesmere. Such, doubtless, is the real consolation of the high-minded and devoted widow, who, cordially participating in all his acts of beneficence, is left to encourage her children to imitate so bright an example.

DR. WM. BUCKLAND.—Lost to the world and to his numerous admirers for several years through an impaired state of the mental faculties, caused by a diseased state of the bones at the base of the skull and of the neck, my valued friend, Dr. Buckland, the Dean of Westminster, expired on the 14th August, 1856, at the age of 73.

The principal merits of this eminent man and the leading events of his life having recently been brought before the Geological Society,‡ of which he was one of the early members, as well as before

* Extract of a letter from Mr. Ralph Sneyd to myself.

† The Rev. St. Vincent Beechey, M.A., brother of our last President.

‡ See Address of the President, Col. Portlock, R.E., F.R.S., Quart. Journ. Geol. Soc. 1857.

the Royal Society, whose chief honour * he had received, it does not become me to attempt any analysis of those writings upon the structure of the globe or its former inhabitants, which have been justly regarded as among the chief stepping-stones to the present state of geological science. I will, therefore, confine myself to a brief sketch of a few points in his character, which may convey to those who knew him not, some idea of the powers and habits of this great geologist.

Educated at Tiverton and Winchester, he obtained from the latter school a scholarship in Corpus Christi College, Oxford. There it was that, after he had become a tutor in classics, a youth came to the University (Oriell College), who, having already attained an acquaintance with fossil organic remains, was destined through that knowledge to influence the future career of many of his associates who had similar tastes. This was William John Broderip, afterwards my colleague during five years as joint secretary of the Geological Society, and now well known as one of the eminent naturalists of our age.

The study of the collection made by this juvenile companion, including the jaw of a marsupial quadruped found in the Stonesfield slate, first awakened the dormant talent of Buckland. Cultivating the friendship of the precocious fossilist, he soon developed that peculiar power, which characterized him through life, of catching up and assimilating with marvellous rapidity everything that illustrated the new science of fossil organic remains, then just coming into vogue through the work of Parkinson. So strongly did Buckland feel in after years the deep obligations he was under to young Broderip, that I have myself heard him speak of the latter as his "tutor in geology."

Admiring the original efforts of William Smith, who, in identifying strata by their organic remains and by his geological maps, has worthily acquired the title of Father of English Geology, Mr. Buckland made numerous excursions to examine the rocks in various districts, and in so doing sought out the few promoters of the rising science. The kindred scientific spirits of his Alma Mater, whether older men or of about his own age, were Pegge, Kidd, and John and William Conybeare, the last mentioned, now the Dean of Llandaff, rising afterwards to be the rival of our deceased member as the celebrated author of the 'Outlines of the Geology of England and Wales.' Thus working onwards he qualified him-

* The Copley Medal.

self to obtain that post of Reader in Mineralogy and Geology, in performing the duties of which, he had the great merit of rousing the University of Oxford from its lethargy in respect to the natural history sciences, and in rendering attractive the study of primeval nature.

It is true that his predecessor, Dr. Kidd, had opened out some good paths in the science of mineral geology; but it was reserved for Buckland to create by his native eloquence and his illustrations, a real and solid taste for geology properly so called, whether as based upon the records of lost races of animals, or on physical geography and the mineral composition of rocks.

Those persons who, like myself, can go back to the days when our deceased member was an inmate of Corpus Christi College, can never forget the impression made upon his visitors, when with difficulty they discovered him in the recess of a long collegiate room, seated on the only spare chair, and buried, as it were, amidst fossil bones and shells. So strange was this conduct considered by the graver classicists, and so alarmed were they lest these *amœnitates academicæ* should become dangerous innovations, that when he made one of his early foreign tours to the Alps and parts of Italy, which enabled him to produce one of the boldest and most effective of his writings, an authoritative elder is said to have exclaimed, "Well, Buckland is gone to Italy, so, thank God, we shall hear no more of *this geology!*" Augmenting his class of students, however, Dr. Buckland persevered successfully in spite of the opposition of the pedagogues of the old school, and certain narrow-minded theologians, who, ignorant of the imperishable records which the Creator has set before us in the book of Nature, endeavoured to destroy the moral influence, if not the character, of any clergyman who boldly taught those undeniable truths. Success happily attended his efforts, and if Buckland had done nothing more than educate a Lyell, a Daubeny, and an Egerton, he would justly have been placed among the most successful instructors of our contemporaries.

Marking the progress which has been made in this branch of science in the few years which have elapsed since it was publicly taught, we may indeed well look back with pity on its feeble opponents, and rejoice that the alumni of the Buckland school have become such strong men, and that the chair, which owed its origin to my illustrious friend, should now be filled by that sound geologist, John Phillips, the nephew of William Smith, who has added to the genius of that geological lawgiver, the richest accom-

plishments of modern science. The publication of his first remarkable work, the '*Reliquiæ Diluvianæ*,' naturally secured for Buckland honours and advancement, and through the patronage of Lord Grenville he obtained a canonry in Christ Church. Shortly afterwards Sir Robert Peel, with the appreciation of true merit which characterised him, sought out and cultivated his intimacy, and then came forth that '*Bridgewater Treatise*' with which his name will be long identified. For to whatever extent new data have since been obtained, this volume will ever remain a proof of the fertility of illustration with which he could reconstruct and set before us the forms of bygone periods,* and thus make evident to all, the prescience of the Almighty as exhibited in former epochs of creation. In a subsequent year we find Sir Robert Peel, to his great honour, presenting Buckland to the Deanery of Westminster, in which position, notwithstanding his hospitality and important occupations, he still found time to travel to and from his Alma Mater, and lecture on his favourite science, till he was stricken down with the illness from which he never recovered.

But let no one imagine that, whilst some of his leisure hours were thus occupied, including arduous efforts to improve the agriculture of our country, Dean Buckland was inattentive to his duties as the Head of an important Ecclesiastical Body. Not only do his surviving colleagues advert with marked respect and gratitude to his judicious efforts and his honourable conduct in improving their establishment, but the public owe to him their real thanks for the energy and determination with which, in a brief space of time, he effected the reform of abuses which had crept into the ancient school of Westminster. In that Foundation, education could no longer be obtained except at costly charges, and even where these were paid, the youths were ill fed and worse lodged. All these defects were speedily rectified by the vigour and perseverance of Dean Buckland. The charges were reduced, good diet was provided, the rooms were well ventilated, and the building properly underdrained; so that, these physical ameliorations accompanying a really sound and good system of tuition, the fame and credit of this venerable Seminary were soon restored.

As it must be my effort when occupying this chair to connect every deceased member with geographical science, let me assure you, from long personal acquaintance with Dr. Buckland, and hav-

* This work, which was rendered much more valuable by the recent discoveries of Professor Owen, was revised by Mr. Broderip.

ing, indeed, received some of my first lessons in the field from him, that he was really a good physical geographer. No one who followed him even from the valley of the Isis to the summit of Shotover Hill, can ever forget how forcibly he impressed upon the minds of his auditors, the causes which had operated in producing the outlines of the ground—how well he made his pupils comprehend why water rose in wells at certain spots and levels, and why other tracts were dry, or how he taught the young agriculturists the elements of draining, and showed them where the vegetation changed as dependent on the nature of the subsoil.

To whatever realm he travelled, whether over the undulations of Germany or the heights and glaciers of the Alps, he adroitly applied and extended these views, and everywhere exemplified (what I have endeavoured to imitate in my own walk) that union of geology with geography, without which the latter science is deprived of its firmest foundation.

While Dr. Buckland evinced enthusiastic zeal and great ability in the development of any phenomena connected with natural history which he could detect, whether in the organization of animals or of plants, he also often sought to apply his science practically. Thus, the most remarkable of these efforts, which I can now call to mind, proceeded from one of his own discoveries. Perceiving that certain fossil convoluted bodies, when extracted from their native bed in the lias of Gloucestershire, presented the appearance of *faeces*, which had assumed that form from passing through the intestines of reptiles or fishes, he submitted the substances to analysis, and when they were pronounced by the late Dr. Prout to be chiefly composed of phosphate of lime derived from the bones of animals, and that even fragments of the bones were detected in them, he assigned to these bodies the name of "Coprolites." With a fervid anticipation he was afterwards led to hope that these fossil bodies would prove of real use to agriculture; and one of the many regrets I have experienced since his bright intellect was clouded, was that my friend had not been able to appreciate the truly valuable results that have followed from this his own discovery, which, at the time it was made, was treated as a curious but unimportant subject, and almost scouted as being too mean for investigation. The hundreds of tons of these phosphatic coprolites and animal substances which are now extracted to the great profit of the proprietors of Cambridgeshire and the adjacent counties, for the enrichment of their lands, is a warning commentary to those persons of

the "cui bono" school, who are ever despising the first germs of scientific discovery.

The full and true character of Dean Buckland is not, however, to be measured by reference to his works only, including his records of those extinct Saurians of which he was the great historian, or his chief work, the 'Bridgewater Treatise,' nor even by his discoveries in a new science. The indelible impression he made upon all who listened to his instructive lectures—lectures like those which may still happily be heard at Cambridge from the lips of his illustrious contemporary, my old friend and coadjutor Sedgwick—and the general influence he exercised over society by the energetic and telling manner in which he inculcated his doctrines, as founded on observation of the progress of nature from the earliest periods to that icy epoch which preceded the era of his own cavern animals; these are the appeals which have procured for him a name which will last as long as the school of British geologists, of which he was so eminent a leader, shall be remembered!

In closing these few sentences, which, if I were addressing a kindred Society, might be expanded into a volume descriptive of the merits of one to whom I was sincerely attached, let me add that in his accomplished relict, our lamented member has left behind him a truly intellectual and excellent woman, who, aiding him in several of his most difficult researches, has laboured well in her vocation to render her children worthy of their father's name.

Dr. Buckland was a member of many European and American Academies, and a Correspondent of the Institute of France. Every where abroad, as at all great British meetings, and in every social party, he was invariably welcomed as the most cheerful and most successful contributor to the advancement of natural knowledge.

Lieut.-Col. NEIL CAMPBELL, who recently died in Paris on his return from Bombay, was an officer on the Quartermaster General's Staff of the East India Company's service, in which he was distinguished for his zeal and intelligence. He was best known to us as the author of the large Military Sketch-map of Scinde. During his stay in this country on leave of absence, he was one of the officers of the Indian Army who attended the funeral of the Duke of Wellington, and was always a welcome and agreeable attendant at our Club and Evening Meetings.

Captain Thomas GRAVES, R.N., who recently fell under the knife of a Maltese assassin, was the son of a gallant officer of the same name and rank. Entering the navy in 1816, and serving in several

vessels on foreign stations, he was chosen, through his merits, to form one of the scientific complement of the *Adventure*, in which ship young Graves played so able a part, that his Captain, now Admiral W. H. Smyth, and other officers strongly urged his promotion. During the next five years, he was a companion of that excellent officer the late Rear-Admiral Philip P. King, in his extensive surveys of the Straits of Magellan and the adjacent shores of South America, and it was only during that difficult service, and in the year 1827, that he was appointed a Lieutenant, *i. e.*, after ten years of arduous probation.

After performing, in conjunction with the Royal Engineers, a survey of Lough Neagh in Ireland, the next ten years of the life of Captain Graves were spent in surveying the Greek Archipelago, first in command of the *Beacon*, and next of the *Volage* corvette. These surveys were suddenly put a stop to by an order of the Admiralty, which both Sir F. Beaufort and Admiral Smyth considered to be an "inscrutable measure," and a heavy blow inflicted on this important branch of the naval service.

Whilst compiling about one hundred charts and plans of the Grecian Archipelago—as interesting to the antiquary and historian as they are valuable to the navigator—Captain Graves had the singular merit of attracting to his little ship the *Beacon*, as his friend and companion, that young naturalist Edward Forbes, then rising in the estimation of his contemporaries, and who, after passing nearly two years in dredging the *Ægean* Sea, and in developing the conditions of life and habits of submarine animals at various depths, threw a broad new light upon geological science. The name of Graves must therefore ever be associated with that of Edward Forbes! Even to Captain Graves himself geologists are much indebted, for his numerous contributions of fossils from distant parts. That these were very important all my contemporaries are aware, and particularly those still living, who, like myself, frequented the rooms of that remarkable naturalist Charles Stokes, whose merits I attempted to place on record for the late Lord Ellesmere when he last occupied this chair. To this Society Captain Graves communicated a description of *Skyros*, and was the cause of our Journal being enriched by the instructive papers of his assistants Spratt and Leicester.

Ever zealous in advancing knowledge, he also afforded to Sir Charles Fellows assistance in the investigation of the antiquities of *Lycia*, that was duly acknowledged. Such conduct surely called

for some mark of public approbation; but although the Sultan and the King of Greece specially thanked Captain Graves for services important to humanity, this meritorious officer never received any honour from his own country. Yet who can place in comparison with the anxious, untiring energy and science displayed during life by such nautical surveys as those of Thomas Graves, the lucky accident of a few months' war service in the Baltic or the Black Sea, in which perchance the individual decorated may not have accomplished any one feat of arms? Honour then to the Governor of Malta, Sir W. Reid, whose warm sympathy was offered to the neglected and really eminent scientific sailor. The offer of the post of Superintendent of the ports of Malta was willingly accepted, and the gallant Graves had zealously performed the duties of it during three years, when he received a mortal stab from a revengeful boatman, that deprived our country of his services. His kind, open-hearted and friendly disposition had long endeared him to every one who knew him; and from a personal intercourse of many years' date, I can well realize to my mind's eye the gloom, as attested by the public journals, which spread over the inhabitants of Malta on the occasion of his sad fate. Captain Graves was an old Fellow of the Royal Society, having been elected in 1826, and he was also one of the original members of the Royal Geographical Society.

Lieut.-Colonel Thomas Best JERVIS, of the Engineers, in the East India Company's Service, who died recently in London, at the age of 60, was formerly well known for his numerous important works in the Bombay Presidency, including Indian Metrology, and an elaborate treatise on the primitive universal Standard of Weights and Measures, &c. When a lieutenant, he served as the engineer in 1821 of the field force under Sir L. Smith sent to the Persian Gulf. On that occasion the Arab pirates were subdued, and the Fort of Beni-bu-Ali was taken after a vigorous resistance; operations in which he was distinguished. After repairing and putting in order many forts he was employed as a captain for ten years in making the trigonometrical survey of the Southern Konkan, a fertile country at the foot of the Ghauts. This Survey, when adjusted by the Grand Trigonometrical Survey, was incorporated into the Atlas of India, of which it formed several sheets. Fertile in resources, he devoted his residuary leisure to various useful purposes, such as building a suspension-bridge or opening out slate quarries in his Eastern abode. In 1838 he was provisionally

appointed by the Court of Directors to be Surveyor-General of India; but the appointment never really took place, as Colonel Everest had not resigned.

Colonel Jervis was the successful translator of Baron Hugel's *Travels in Cashmir*, and he had, I understand, translated other voyages and travels, which were never printed. Being well known for his untiring energy and his accomplishments as well as for his acquaintance with foreign languages, and having shown his foresight by the publication of a translation of the Russian map of the Crimea, and the rapid transference by the anastatic process of the Austrian military map of Turkey and the adjacent countries, he was proposed to the Treasury, and was appointed during the late war, to organize and conduct a topographical sub-department of the Government, in which he prepared numerous maps and plans. He had been a Fellow of the Royal Society since the year 1838, and was a frequent contributor to the library and map office of this Society.

The Rev. Thomas HALFORD, M.A., Oxford, who died in the 68th year of his age, was a well educated gentleman, and ever desirous of promoting art and science. Being partial to the Geographical Society, and a constant attendant at our anniversaries, we shall this day mark with regret his absence from our festive board.

Sir James MEEK was a highly respected and useful public servant, who, for his administrative talents in the victualling department of the Navy Board, was knighted and honoured with the Companionship of the Bath. An old member of this Society, he served on our Council for several years, and always supported our cause as long as he remained in London. Retiring from public life, he lived during the last few years at Ilfracombe in Devonshire. Being gifted with a kind heart, and possessing the most gentle manners, Sir James Meek was much beloved by all who knew him.

James Meadows RENDEL, the celebrated engineer, has had such ample justice done to his merits by those who can best appreciate them, whether at the Royal Society, or the Institution of Civil Engineers, that it would not become me to weaken such descriptions by any panegyric of my own. The skill and decision which he displayed in many works, such as a cast-iron floating or suspension bridge, and numerous piers and docks, besides innumerable hydraulic operations, were crowned by his two great achievements, the harbours of refuge of Holyhead and Portland. These, in the estimation of his associates, are alone sufficient to hand down his name to

posterity with a Smeaton, a Rennie, and a Telford. Consulted also by various foreign Governments, he was associated with M. Lesseps and Mr. Charles Manby as one of the International Commission for the construction of the Canal of Suez. Mr. Rendel was born in 1799, was elected a Fellow of the Royal Society in 1843, and was, during two years, President of the Institution of Civil Engineers. His death, which occurred on the 21st of November, 1856, was deeply lamented by all his friends and associates.

Mr. John KENYON, who died in December last, was born in 1784 or 1785. He was, for some years, at Mr. Seyer's school, at the Fort, Bristol, several of his companions from which seminary have since won for themselves fame and honour in the service of literature and science. Amongst his favourite playmates were John Eagles, known in later days as the author of 'The Sketcher;' Broderip, the naturalist; and Andrew Crosse, the electrician. These schoolday friendships remained through life, unclouded by a shadow.

After Mr. Kenyon quitted the University of Cambridge, he spent some time on the Continent, but, returning to England, he formed friendships with Wordsworth, Southey, and Davy. He was not only the friend of poets, but was himself a poet; having published, a few years since, at intervals, two volumes which show considerable originality, as well as a refined and cultivated taste. These poems breathe the spirit of a mild and tolerant man, wishing well to his fellow-creatures, with a liberality something more than orthodox, and seeing all things in the sunny hue of his own generous nature.

Mr. Kenyon's appreciation of genius and talent drew around him many savans and literati of the day, among whom his genial sociability seemed to have the power of amalgamating the most dissimilar natures, and of softening asperities between individuals. He was a person to whom no man volunteered to tell the worst he knew of his neighbour. He liked to see, talk, and hear of pleasant things; but he was one who feelingly shared the sorrows of his friends. His heart was ever full of true sympathy, and his hand ever ready to assist those who required his aid. In one year he spent four thousand pounds in acts of *private* charity!

Mr. Kenyon died on the 3rd of December, 1856. All those who knew him well, feel what they have lost; those who knew him but slightly will not soon forget his ever kind and bland manners. By his noble and generous will he divided his large fortune amongst

his numerous living friends, and the children of such of his old friends who had before him "gone to the many."

Vice-Admiral Lord RADSTOCK, C.B., has very recently been taken from us. Born in 1786, and entering into the profession of his father, the well-known admiral, who won the battle off Lagos in 1797, he distinguished himself in several engagements in the Mediterranean, in the last as Captain Waldegrave, and off the Italian coast, in destroying the batteries at the mouth of the Rhone. He was afterwards made naval aide-de-camp to the Queen. Although the death of Lord Radstock seemed appallingly sudden to those who had seen him sitting at the General Meeting of the London University a few days before, yet others who, like myself, had watched with grief the rapid change in his health during the preceding months, were not unprepared for the sad event. Valuing Lord Radstock highly for his personal qualities, I can truly say that the death of this brave officer and excellent man created a very general feeling of real sorrow, as deep among his friends and acquaintances as in all those public bodies, and numerous charitable institutions, in the welfare of which he took a warm interest.

Robert ANDERSON, Surgeon, R.N., who died in June, 1856, at the early age of 38, was born in the parish of Fettercairn, Kincardineshire. Receiving his early education at the Academy of Montrose, his medical studies were carried on and completed in the University of Edinburgh. Entering the Royal Navy, as an assistant-surgeon, in 1838, he served successively in the Royal Adelaide, the Princess Charlotte flag-ship, and in the Powerful, being on board the last-mentioned ship when commanded by Sir C. Napier at the siege of Acre and during other operations on the coast of Syria. Afterwards serving upon the East India and China station in the Agincourt, Spiteful, and Dædalus, and obtaining the rank of surgeon, he again passed to the Spiteful, in which he returned from India in 1847. In the following year Mr. Anderson was appointed surgeon of H. M. S. Investigator, Captain Bird, which shared in the expedition of Sir James Clark Ross to the Arctic Seas; and in 1849, he was again selected for similar service as surgeon of H.M.S. Enterprise, Capt. Collinson, in which he continued to serve till the return of that vessel to England. With the exception of scarcely 9 months, Mr. Anderson was constantly employed afloat for a period of nearly 17 years, of which 7 were spent in Arctic service.

Besides writing extended journals, Mr. Anderson made a large

collection of specimens illustrative of the natural history of the Arctic regions. Of this collection the zoological specimens were deposited in the British Museum, the dried plants being sent to Sir William Jackson Hooker at Kew, and the fossil remains to the Geological Society.

Frank, generous, and warm-hearted, esteemed alike for his professional abilities, scientific attainments, and private worth, his conduct through life exemplified a high-toned sense of honour and manly independence of character, and his premature death has caused real sorrow to his numerous friends.

Charles ELLIOTT, Esq., who died in May, 1856, at the age of 80, was a sagacious and esteemed Civil Servant of the East India Company. He always strove to promote the advancement of knowledge and geographical science, and was much beloved for his social qualities. Acting in various important capacities in Hindostan, he eventually rose to be the senior member of the Board of Revenue in Bengal, and agent to the Governor-General in the western provinces, in which capacity he proved a worthy successor of Sir Charles, afterwards Lord, Metcalfe.

Mr. Elliott had been, since the year 1832, a Fellow of the Royal Society, by whose members, as by our own, he was much esteemed; but it is specially in the Asiatic Society, of which he had been some years the Treasurer, that his loss is most felt, as evidenced by the Annual Report of that body, in which the soundness of his judgment, the integrity of his character, and the discrimination of his taste are justly extolled.

Lewis H. J. TONNA was a praiseworthy person, who formerly serving as a purser in the Royal Navy, became Secretary of the United Service Institution, and continued to carry on the business of our neighbouring establishment for many years with much efficiency and most obliging manners.

W. H. PEPYS, a native of this metropolis, was born in 1775. He succeeded to his father's trade in the Poultry as cutler and maker of surgical instruments. From his earliest years he devoted himself zealously, disinterestedly, and uninterruptedly to the advancement of science. It is now exactly half a century since Allen and Pepys communicated to the Royal Society the memorable experiment by which the identity of diamond with other known forms of the element carbon was confirmed. It was, however, as the contriver of ingenious modifications of chemical apparatus, that Mr. Pepys rendered the most signal service to scientific men.

During every phase of the rapid progress of chemistry, the gas-holder which bears his name, has maintained its place as well in the lecture-theatre, as in the laboratory of research. I have reason to believe that the arrangement of the magnificent voltaic battery, by which Davy decomposed the alkalies at the Royal Institution, was, more or less, confided to Mr. Pepys: hence, probably, originated the friendly regard in which he was held by that eminent philosopher. In the *Philosophical Transactions* for 1823 there is a description of a voltaic apparatus, consisting of two elements only, for electromagnetic research, made under Mr. Pepys' directions for the London Institution.

Let me add that Mr. Pepys was always anxious to associate with those who, like himself, desired to cultivate science for its own sake. He joined our Society at its commencement. He was one of the early promoters of the London Institution, and an original Member of the Geological Society. He was also a Member, and an office-bearer in the Royal Institution, where he received the honour of one of the ten Gold Medals awarded for chemical discovery. He died at his house, Earl's Terrace, Kensington, August 17th, 1856, aged 81.

A Foreign Associate whose loss we have to deplore during the past year is Baron von HAMMER-PURGSTALL, the distinguished Oriental scholar, poet, and historian. Attracted from his earliest childhood towards the East and Eastern literature, no one has done more good, in spreading the knowledge of Oriental History and Literature amongst the literary circles of Western Europe, than the learned author of the 'History of the Ottoman Empire.' Born at Gratz, in Styria, in 1774, he entered the Oriental Academy at Vienna in 1788, where he attracted the attention of the celebrated Jenisch, whom he assisted in the preparation of his edition of 'Meninski's Lexicon.' He subsequently entered the Austrian diplomatic service as Interpreter at Constantinople, he then served in the same capacity to the British army during Abercrombie's campaign, and after acting as Attaché to the Austrian Embassy at Constantinople and as Consul in Moldavia, he was appointed Interpreter to the Vienna Chancery in 1811. From this time devotion to Oriental Literature became the leading object of his laborious life; and when he subsequently quitted the public service he pursued his favourite studies on his estates in Styria.

Some opinion of his active energy may be formed from the long

list of works which he published,* in which great research, combined with much originality, is one of the most characteristic features. But the work which has formed the basis of his European reputation was undoubtedly his 'History of the Ottoman Empire,' by far the most important work yet written on this interesting subject, though even here he has been accused of an undue bias toward the House of Austria; a bias, however, as pardonable as it is natural in such a case.

He died at Vienna on the 16th of November, 1856, in his 83rd year. His monument, which he had himself prepared forty years before his death, is placed at his own request in the cemetery of Weidling, near Kloster Neuburg. In a spirit of humble piety he addressed a letter to our Secretary not long ago, in which, after announcing the formation of a Geographical Society at Vienna and presenting to this Society a copy of his last works, he adds:—"As there is little probability that I shall be long enough in life to see the end of the printing of this work, I mention the circumstance that you may claim after my death the continuation of the work from the Imperial Academy."

J. F. WAHLBERG, the Swedish Explorer and Naturalist, already known for his travels in South Africa in 1843, was killed by an elephant on the 6th of March, 1856, on the border of a river about 200 miles N.E. of Lake Ngami, probably the River Tamunakle of Livingstone. His collections have been sent to the Cape. His companion Mr. Green had ascended the Tioghe as far as Libebe, 100 miles to the south of which he was forced to leave his boat on account of the rapids.

M. Wahlberg, who was a Member of the Royal Academy of Sciences of Stockholm, had returned to his native land in 1844, but the indomitable desire to make new discoveries in natural history led him to revisit Southern Africa in 1854. Endowed with profound knowledge in zoology and botany, M. Wahlberg, being specially characterized by a modest and unassuming manner, was truly

* Amongst his numerous publications the most important are, 'Encyclopedic View of Oriental Science,' 1804; 'Glance at Turkish Literature,' 1816; 'History of Persian Belles Lettres,' 1818; 'History of the Assassins,' 1818; 'History of the Ottoman Empire,' 1827-1834; 'History of Ottoman Poetry,' 1830-1838; 'The Mongols in Russia,' 1840; 'Geography of Arabia,' 1840; 'The Mongols in Persia,' 1843; 'Treatise on the Seals of the Arabs, Persians, and Turks,' 1849; 'Report on Reinaud's French Translation of Abulfeda's Geography,' 1849; 'Report on Printed and Lithographic Works published at Constantinople during the Years 1845-1848.'

beloved by all those who knew him, and his death at the premature age of forty-four, occasioned general sorrow throughout Sweden.

Lastly, let me close this enumeration of our deceased friends by alluding to our late honorary Foreign Member, Dr. Elisha Kent KANE; although no language of mine can express the deep regret I feel at the premature decease of this heroic young Arctic explorer.

The son of a distinguished Judge of Pennsylvania, he was born in 1822, and educated at the Universities of Virginia and Pennsylvania. Accompanying as a medical officer the first American Expedition to China, he explored the Philippines, chiefly on foot, and made maps of those islands. Having survived severe attacks of fever he examined the volcanic region of Java, and was the first to descend into the great crater of Tael and make a sketch of its interior. In this early effort, the zeal of the youth seemed to have no bounds, for he was lowered upwards of 700 feet by a bamboo rope, and from the effects of the strong sulphurous fumes was senseless when hauled up to the rim of the orifice. He not only traversed India and Ceylon, but also visited Egypt, where he was associated with Lepsius; but unfortunately lost his notes and papers, and being stricken with the plague, narrowly escaped death. Subsequently he sailed to the west coast of Africa, examined the slave factories, and proposed to make a journey to Abomey, which he never accomplished, owing to a violent fever, from which he suffered during his life—a fact which is not to be passed over without the comment, that his Arctic sufferings were *not* the cause of his decease; for he returned from his last perilous exploits in perfect health. His bravery, ability, and generosity were next conspicuously elicited in the Mexican war; and even then he endeavoured to find time to make barometrical observations on the height of Popocatepetl. Having volunteered his services as surgeon to the first American expedition in search of Franklin, he published a narrative of this voyage under De Haven. Finally, he performed those extraordinary researches beyond the head of Baffin Bay, which obtained for him our Gold Medal at the last anniversary and the unqualified admiration of all geographers. At that time, however, we had not perused those thrilling pages, which have since brought to our mind's eye the unparalleled combination of genius, with patient endurance and fortitude, which enabled this young American to save the lives of his associates. With what simplicity, what fervour, what eloquence, and what truth has he described the sufferings and perils from which he extricated his ice-bound crew! You must, indeed, all agree

with me, that in the whole series of literature there is no work, which more feelingly developes the struggles of humanity under the most intense sufferings, or which demonstrates more strikingly, how the most appalling difficulties can be overcome by the union of a firm resolve with the never-failing resources of a bright intellect. In all these heart rending pages there is no passage which comes more home to the Englishmen who are still advocating the search for the relics of the Erebus and Terror, than that in which, after judging from the experience of his own companions, how men of our lineage may be brought to bear intense cold and trail on their existence among the Esquimaux, he thus soliloquises:—"My mind never realizes the complete catastrophe, the destruction of all Franklin's crews. I picture these to myself broken into detachments, and my mind fixes itself on one little group of some thirty, who have found the open spot of some tidal eddy, and under the teachings of an Esquimaux, or perhaps one of their own Greenland whalers, have set bravely to work and trapped the fox, speared the bear, and killed the seal, the walrus, and the whale.—*I think of them ever with hope. I sicken not to be able to reach them.*"* These generous and lofty sentiments, as I shall afterwards point out in dwelling on Lady Franklin's final search, are shared by that distinguished Arctic officer, our associate Captain Hartstene, of the United States' Navy; and they have justly awakened the hope in the breasts of many of my countrymen as well as myself, that some of the fine young fellows who sailed with Franklin may still be alive—the conviction that they must, for the honour of our country, be sought for, as well as the débris and records of the Erebus and Terror.

It was, indeed, a subject of great regret to me that when Dr. Kane visited England last autumn, this metropolis (as is usual at that season) was deserted by many of those persons who most valued his character, and that none of those attentions could then be paid to him which, had his stay amongst us been prolonged, would doubtless have been showered upon him from the Sovereign downwards. But, alas! the stroke of death was already upon him, and when I first shook his hand, I at once saw that his eagle-eye beamed forth from a wasted and all but expiring body. As geographers we were not, however, remiss in our endeavours to honour him; and although his malady prevented his attendance at our apartments to receive our heartiest welcome, I then proposed

* Kane's Arctic Expedition, vol. i. pp. 243-6.

the Resolution expressive of our admiration of his conduct, which you passed with acclamation, and which was communicated to him personally by our lamented late President, Admiral Beechey.* Hurrying away to the Havannah to seek a milder clime, Dr. Kane there terminated his noble and brilliant career. If on the subject of Arctic research our meed of praise has justly been offered to such pure philanthropists as Grinnell and Peabody, let me say that there never has been an occasion in which the people of the United States have done greater honour to themselves than by the manner in which they sought to testify their respect for the memory of their young hero Kane, when his mortal remains reached his native city of Philadelphia. "The long procession of mourners (as is recorded in the 'Philadelphia Evening Journal' of March 12), the crowded yet silent streets through which they move, the roll of muffled drums, the booming of minute guns, the tolling of passing bells, the craped flags at half mast, and all the solemn pageantry of the scene proclaim that it is no ordinary occasion which has called forth these impressive demonstrations of public respect." Agreeing entirely with this eloquent writer, that few men have ever lived, who have earned a better title to the esteem and admiration of his race, and also warmly commending to your notice the sentiment proceeding from a great commercial city of our kinsmen, "that we are not to look to the mere *utilitarian* value of Dr. Kane's labours and adventures, to the claim for that bright and unfading glory which must ever surround his name," let me say that, by re-echoing the voice of America on this occasion, England can best cherish the memory of one who dared and did such heroic deeds to rescue our lost navigators.

Having thus imperfectly glanced at the feats which our deceased Medallist had accomplished in the short life-time of thirty-five years under the impulses of humanity and science, I cannot better sum up his virtues than in the words of the divine who preached his funeral sermon†—"He has traversed the planet in its most inaccessible places, has gathered here and there a laurel from every walk of physical research in which he strayed, has gone into the thick of perilous adventure, abstracting in the spirit of philosophy, yet seeing and loving in the spirit of poesy, has returned to invest the very story of his escape with the charms of literature and art, and dying at length in the morning of his fame, is now lamented with mingled affection and pride by his country and the world."

* See Geographical Proceedings, Jan. 1856.

† The Rev. C. W. Shields.

GEOGRAPHICAL PROGRESS.

Admiralty Surveys.—The Maritime Surveys of Britain have been steadily carried forward during the past year. I am informed by Captain Washington, R.N., Hydrographer to the Navy, the worthy successor of Admiral Sir F. Beaufort, that twenty different surveying parties are in active service, about one-half of which are employed on our own coasts, the remainder in the Colonies, the Mediterranean, the River Plate, the South-western Pacific, and the coast of China.

England.—To begin with operations at home. Sanitary measures connected with the metropolis have necessitated a fresh survey of the upper portion of the River Thames. At the instance of the First Commissioner of Works, Commanders Burstal and Cudlip, in August last, began a minute survey of the river from London Bridge upwards to Putney, a distance of about $7\frac{1}{2}$ miles, running again the identical lines of sections, at about 700 feet apart, taken by Giles in 1823, in order to institute a comparison as to the change in the bed of the river. These soundings have been laid down on the sheets of the Ordnance Survey of London on a scale of 60 inches to a statute mile, a scale sufficiently large to show minutely every feature.

The result, as shown in Commander Burstal's Report and Transverse Sections, is that since the year 1823 the average deepening of the bed has been about 4 feet from Putney to Westminster Bridge, and about 6 feet from Westminster to London Bridge; but this average by no means shows the extent of the scour consequent on the removal of Old London Bridge in 1832, as, for instance, near the Grosvenor Canal there are places where the deepening has been 13 feet; at Westminster Bridge 10 feet; at Hungerford $11\frac{1}{2}$ feet; and above Southwark Bridge 14 feet. These figures are highly instructive, as showing the improvement which might be expected in other rivers in this country, if the old fashioned bridges which now act as dams were removed, as in the Tyne, the Slaney, and the Liffey; and if Newcastle, Wexford, and Cork Bridges were rebuilt with proper openings.

The sounding of the upper part of the Thames will be continued in sections of 150 feet apart from Putney to near the Thames Tunnel, about $1\frac{1}{2}$ miles below London Bridge. At that point it has been taken up by Commander Cudlip, who is now engaged sounding Greenwich, Blackwall, and Woolwich Reaches, the plans of which, it may be hoped, will form the foundation for a systematic and ex-

tensive dredging of all the upper part of the river so soon as the Thames Conservancy Board can be brought into action.

On the East Coast of England, Mr. E. K. Calver has revised all the charts during the past year, and inserted the changes that have taken place during the last ten years, and especially in the frequented anchorages of Yarmouth and Lowestoft Roads. He has also prepared the Sailing Directions for this coast and for the opposite shore of Belgium, Holland, and Jutland up to the Skaw, which will form Parts III. and IV. of the 'North Sea Pilot' now in preparation.

On the South Coast of England, the surveying party under Commander Cox and Messrs. Osborne and Davis have just completed a careful examination of Plymouth Sound, whence it appears that that well-known roadstead has not silted up in any appreciable degree since the breakwater was placed across its entrance—an interval of five and forty years—the first stone having been deposited in August, 1812.

In Cornwall, Captain Williams and Mr. Wells have completed the survey of the Fowey River, from Lostwithiel to the sea, and a portion of the coast from Fowey to the Dodman.

In the Bristol Channel, Commander Aldridge and Mr. Hall have surveyed Caldy and Tenby Roads, where they have discovered and mapped several new rocks and shoals not before pointed out.

Scotland.—In the Frith of Forth, Lieut. Thomas and Mr. Sutton have surveyed the coast of Haddington by Dunbar and St. Abb's Head to Coldingham, and have completed the outer soundings to the eastward of the Isle of May, which mark the approach to this extensive estuary.

Farther north, a detailed plan of the Bay and Harbour of Wick and Pulteney Town has recently been published at the Admiralty, preparatory, we trust, to the laying out of a Harbour of Refuge on that exposed coast, where in an easterly gale the 1000 herring-boats that annually fish out of Wick have no shelter to run for. The numbers of valuable lives at stake in these important fisheries imperatively demand that a suitable harbour in the most appropriate spot should be constructed without further loss of time.*

The Sailing Directions for the Orkneys and Shetland, originally drawn up by the late Commander Thomas, and revised and corrected by Mr. E. K. Calver, have been published during the past year, and

* A subject of considerable importance to physical geographers as connected with the harbour of Wick will presently be discussed (*see* Physical Geography).

they form Part I. of the four parts of the 'North Sea Pilot,' the whole of which work will, we trust, be in the hands of the mariner before the close of the present year.

On the north-west coast of Scotland, Commander Wood has surveyed a small portion of Skye, while Mr. Jeffery has mapped Loch Nevis. Several detached Charts also of these coasts have been published during the past year, as lochs Broom, Ewe, Hourn, Gairloch, Edrachilles Bay, including the lochs, Raasay and Inner Sound, Sounds of Seil, Mull, Sleat and Kyle Rhea.

In Argyleshire, Commanders Bedford and Creyke, and Mr. Bourchier, have added to our knowledge of the north shores of the isle of Mull, and have re-examined Oban bay.

In the Hebrides some soundings off the isle of Lewis have been obtained by Captain Otter and his staff in the Porcupine; and during the present season a survey of the Sound of Harris will, it is hoped, prove to the mariner whether, in case of need, he may safely run for that strait.

Ireland.—On the north-eastern shore of Ireland, Messrs. Hoskyn, Aird, and Yule, have completed the examination of Belfast Harbour, and made patent the improvements that public spirit, combined with good engineering, has within the last few years effected in that port. They have also mapped a portion of the coast of Antrim, from Garrow Point to Ballygally Head, the fine natural harbour of Lough Larne, and the artificial packet-station of Donaghadee.

In Wexford, on the south-eastern coast, Captain Frazer and Lieut. Bullock have re-examined the channels and banks at the entrance of that harbour, where some remarkable changes have taken place, and made a detailed survey of the River Slaney up to the town of Enniscorthy, preparatory, we trust, to some extensive improvements in the channel—a measure which could not fail to be attended with corresponding benefit to the fertile country which that river drains.

In Donegal, on the north-west coast, Captain Bedford and Lieut. Horner have completed elaborate plans of Sheep Haven and Mulross Bay. By permission of the Admiralty, these plans have been exhibited at our evening meetings, and I am sure you will all willingly join with me in acknowledging the apparent fidelity and beauty with which the features of these natural inlets have been portrayed.

In Kerry, on the south-western coast, Commanders Beechey and Edye, with Mr. W. B. Calver, have mapped a portion of Tralee and Brandon bays, while Mr. McDougall has surveyed Dingle and Ventry harbours, which lie on the southern side of the same bold projecting

peninsula of Kerry, and which, having twice examined myself, I can testify to be the most interesting part of Ireland, in showing certain relations of the Silurian to the Devonian rocks, which can nowhere else be seen in the sister island.

The neighbourhood of this immediate coast, on the south side of Dingle Bay, is about to become a site of much interest and importance, the small island of Valentia having been selected as the Eastern or European terminus of that Atlantic Electric Telegraph Cable, on which I shall presently enlarge, as destined to unite the two continents in stricter bonds of amity and good fellowship.

It must interest my hearers to know that Lieut. Dayman, R.N., who was a companion of Sir James Ross in his voyage to the Antarctic regions, will leave England in a few days in command of the Cyclops steamer, to carry a line of deep sea soundings across the Atlantic, from Valentia to Trinity Bay in Newfoundland. The vessel is furnished with some 20,000 fathoms of line of different sizes, a portion being of silk, with an abundant supply of sounding machines, and a steam-engine on deck on purpose to heave in and reel up the line, and we may fairly hope, ere long, to have a second continuous line of soundings across the Atlantic, and know the nature of the bed on which the Telegraph Cable will have to repose.

With the authority of our Council, I took advantage of the announcement of this expedition, so deeply interesting to naturalists, and suggested to the Hydrographer that, the opportunity being one which might never recur of obtaining an accurate acquaintance with submarine life at great depths, a competent naturalist might be allowed to accompany the survey, or that in any case the medical officer of the Cyclops might be so instructed as to record accurately the phenomena.

Black Sea.—In quitting our home for foreign shores, the survey of the Delta of the Danube claims precedence, and is entitled, in the opinion of my eminent friend Captain Washington, to our warmest acknowledgments for the admirable manner in which it has been carried out by Lieut. Wilkinson, R.N., under the orders of Captain Spratt, R.N., C.B., whose report on Fidonisi, or Serpent Island, has been communicated to the Society by the Admiralty. This recent survey of the streams which form the delta of the Danube is comprised in several charts, filled almost to overflowing with soundings of the three principal branches, Ochákov or Kilia to the north, the Súlina in the centre, and the St. George or Khedriliz to the south. These plans are now lying on the table before us, and

they bespeak for themselves our admiration of the beauty of their execution and of the unflinching perseverance with which these services were accomplished in the short period of a few months of last autumn.

Sea of Azov.—During the present session, we have received from our associate, Captain Sherard Osborn, R.N. (so honourably known to us by his Arctic explorations and writings), an interesting communication on the geography of the Sea of Azov, the Putrid Sea, and the adjacent coasts, with remarks on their commercial capabilities. As the hydrographical features of this area are peculiarly deserving of notice, I naturally treat of them under the head of the British Naval Surveys. In no part deeper than 40 feet, the centre of this sea forms a flat basin 55 miles in extent from east to west, and 35 from north to south, with an inclination from the edge of this level to the coast of about a foot per mile, increasing somewhat in abruptness as the water shallows.

The sandy spits, which are so remarkable, and are attributed by the author to volcanic action, afford a shelter against easterly winds, but there is no protection in any part of the sea against those from the west. When this communication was read, I confirmed, from personal observation, the accuracy of Captain Osborn's remarks upon the rapid accumulation of sand on these spits; and the fact of their being precipitous on the east side and shelving on the west is a good addition to our knowledge. There can be no doubt, however, that the base of some of them, near the ports, consists of knolls formed by the discharge of ballast from trading-vessels, thus forming nuclei for fresh alluvial deposits, which, after a short time, become connected together; and unless means be adopted for checking this system of accumulation, the Sea will, before long, be hardly navigable in certain places.

The assertion of M. Taitbout de Marigny, that there is little current in the Sea of Azov, is shown by Captain Osborn to be an error; the existence of currents being indicated, not only by the influence of the winds on the motion of the water, but also being plainly manifested by the outflow from the delta of the Don, the Sivash, and the rivers between Taman and Kamisheva. The physical features of the Spit of Arabat, and of the Sivash or Putrid Sea, are described from observations made, under very difficult circumstances, during the late war.

Mediterranean and Archipelago.—On a recent route from Malta to the Dardanelles, Captain Spratt had an opportunity of obtaining a

line of deep sea soundings between that island and Candia, in which the greatest depth was 2170 fathoms. The section is very striking; for a distance of 50 miles to the eastward of Malta the depth does not exceed 100 fathoms, after which it drops almost suddenly to 1500 and 2000 fathoms, and continues near that level *below* the surface of the sea until within 20 miles of the east end of Candia or Crete, where the White Mountains and Mount Ida rise up to a nearly equal height *above* the level of the sea. Between Crete and the Dardanelles the greatest depth is 1110 fathoms.

Africa.—On the North Coast of Egypt, Commander Mansell in the *Tartarus*, with his assistants, Lieut. Brooker and Mr. Skead, have completed a survey of the coast from Damietta eastward to El Araish, an admirable plan of the port of Alexandria, and a survey of the bay of Suez, a place daily becoming of more importance as our direct mail communication extends to India, China, and Australia.

Taking advantage of fine weather and a calm sea, Captain Mansell has lately run a line of soundings between Alexandria and the island of Rhodes. From the coast of Egypt the depths gradually increase until at 70 miles off they reach 1000 fathoms, at 110 miles 1600 fathoms, which is the maximum depth of this portion of the basin of the Levant. The above soundings are of great interest to the geologist as well as the geographer, and do much credit to the officers who, overcoming many difficulties, have succeeded in carrying them out.

While on this subject I should mention that, in October 1856, Messrs. Delamanche and Ploix, Ingénieurs Hydrographes of the French Imperial Marine, carried a line of soundings across the Mediterranean between Port Vendres in France to Algiers, in which the greatest depth was about the same as in the Levant, namely 1600 fathoms.

South Africa.—In the Cape Colony the only addition we have to record is the completion by Mr. Francis Skead of the survey of Port Natal, begun by Lieut. Dayman, R.N., in 1855. I cannot here but repeat the words of my predecessor in this Chair, that both the land survey of the colony and that of the coasts ought to be pressed forward. Every year that they are delayed bars the progress of the settlers, hinders the development of the resources of the district, and is attended with loss to the colonial exchequer.

China Seas.—In the last anniversary Address a hope was expressed that Captain Bate, the surveyor of the island of Paláwan, might be more usefully employed in China than in merely commanding a

cruizing ship. It is gratifying to be able to state, that a thoroughly equipped surveying vessel, the *Actæon*, accompanied by a small steam tender the *Dove*, under command of Lieut. Bullock, has sailed for those seas, and as soon as the present unfortunate differences with China are settled, Captain Bate will resume his survey on such parts of the coast as most require it. In the meantime, Messrs. Richards and Inskip in the *Saracen* will proceed forthwith to make a detailed survey of the dangerous shoal *As Pratas* (lying only 60 leagues to the E.S.E. of our own colony at Hong Kong), with a view to the construction of a lighthouse upon that extensive coral reef which has caused the wreck of so many vessels.

Siam.—The chart of the Gulf of Siam has been materially improved during the past year. Messrs. Richards and Inskip have visited Bangkok, where they experienced great attention and assistance from the enlightened ruler of that country; they have rectified the positions of several islands and of many of the headlands and capes on the western as well as on the eastern shore of the gulf.

Tartary.—Farther north on the coast of Tartary the officers of one of our cruizing vessels, the *Barracouta*, have examined a harbour, which they have named after that ship, and in which the Russian frigate *Pallas* had taken refuge. This capacious harbour is the same as that called *Imperadorski Gavan*, or *Port Imperial*, by the Russians, and lies about 130 miles south of *Castries Bay*.

In the Admiralty chart of these regions the whole course of the *Amúr* has been laid down from the astronomical observations made by *Peschurof* in 1855, which render the river quite a new feature in our maps. The details of these observations are given in the '*Morskoi Sbornik*,' or *Russian Nautical Magazine*, for March and May, 1857. They are also to be found in that excellent geographical periodical, '*Mittheilungen*,' edited by Dr. A. Petermann at Gotha.

New Zealand.—The publication of the detailed charts of the coasts and harbours of this group of islands advances rapidly; the past year has produced four coast charts, on the scale of 4 miles to an inch, and 11 plans of harbours and rivers, including *Auckland*, *Waitemata*, *Taupanaa*, *Whangaroa*, *Hokianga*, &c., being a portion of the ten years' labour of Captains *Stokes* and *Drury*, with Messrs. G. Richards, Frederick J. O. Evans, J. H. Kerr, &c., and we trust that before the close of the next year every item of information we possess of these islands will be in the hands of the mariner.

Pacific Ocean.—Captain *Denham* in the *Herald* continues his

useful labours in the south-western Pacific. During the past year he has surveyed several islands of the Fiji group, as Angau, Matuka, Mbatiki, Moala, and has swept from the charts the imaginary Underwood and Rosaretta reefs. Assistant-Surgeon Macdonald of the *Herald* has made a journey into the interior of the island *Viti Levu*, which, with a track chart of the route, has been communicated to the Society by the Admiralty. Various views of headlands and characteristic sketches of the scenery and of the natives have been made by Mr. Glen Wilson, artist to the expedition.

A chart of the Pacific Ocean, in 12 sheets, on the scale of $\frac{1}{1000000}$ ths of an inch to a degree, has recently been published by the Admiralty, in which the curves of equal variation have been carefully laid down for the year 1855, by Mr. Frederick J. O. Evans, chief of the Compass Observatory. The whole forms a valuable contribution to hydrography, and physical geography.

America.—Pursuing our imaginary eastern route, we have the gratification to announce that a well organized expedition, under the command of Captain George Richards, R.N., favourably known as a fellow-labourer with Captain Stokes in the survey of New Zealand, has sailed for Vancouver Island, to determine, in conjunction with the United States Commissioners, the boundary, as laid down by treaty, between the British and American possessions. This expedition cannot but be productive of a good harvest of geographical information.

In the Rio de la Plata, Lieut. Sidney, with slight means at his command, has fixed the position of the north edge of the English Bank, lying some 10 miles south of Monte Video; he has completed a detailed plan of the river and outer roadstead of Buenos Ayres, and has partially examined the lower course of the Uruguay.

On the coast of Brazil, Lieut. Parish, R.N., has furnished plans of several small harbours and otherwise improved our charts, while a more complete Sailing Directory, founded on the labours of Baron Roussin, is in course of preparation by Rear-Admiral FitzRoy.

West Indies.—The additions to geography in the West Indies consist in a survey of the island of Santa Cruz, and the harbour of Christianstadt, by Messrs. Parsons and Dillon; a re-examination of the harbour of Grey Town by Mr. Scott, master of H.M.S. *Impérieuse*, and some new coral patches discovered among the Pearl Cays.

Nova Scotia.—In the Bay of Fundy, Commander Shortland, with Lieut. Scott and Mr. Scarnell, has completed the soundings in the

vicinity of the Grand Manan islands at the entrance of the Bay, and has mapped a further portion of the south-western coast of Nova Scotia.

Gulf of St. Lawrence.—Rear-Admiral Bayfield, in succeeding to his flag, retires from the command of the survey of the Gulf and River St. Lawrence, on which extensive work he has been engaged upwards of a quarter of a century. It has fallen to the lot of few officers to originate and bring to a close, after so many years, so extended and laborious a work, where the Surveyor had to contend with a rigorous climate in winter and fogs in the spring and autumn, leaving but a short season in which outdoor work could be executed. It has, however, been done in a masterly manner, as more than 100 published charts and plans, complete sailing directions, and a valuable table of Geographical Positions connected with Quebec, Halifax, and Boston, most fully testify. I am sure you will all join cordially with me in wishing many years of honourable repose to the gallant Admiral whose labours have bestowed so valuable a boon on the mariner, and whose previous observations, let me add, on various glacial phenomena, including the transport of blocks by the ices of the St. Lawrence, have been of signal service to geological science.

Commander Orlebar, the former chief assistant, succeeds to the charge of the survey, which will be continued along the eastern shores of the peninsula of Nova Scotia.

Ordnance Survey of Great Britain.—No change, as I am informed by the able superintendent of the Ordnance Map Office, Lieut.-Colonel James, has been made in the orders relative to the survey during the last year, and the progress in the north of England and Scotland for the twelve months ending on the 31st of March has been very great, amounting to 1,394,409 acres, finished in every respect for publication.

The publication of the following counties has been finished within the last year, viz. Yorkshire, Fifeshire, Kinross, and Linlithgowshire.

The publication of the following counties is in progress, viz. Durham, Ayrshire, Dumfriesshire, Renfrewshire, and Berwickshire.

The survey of the following counties has been finished during the last year, viz. Berwickshire and Selkirkshire (nearly).

The Survey is in progress in the following counties—Northumberland, Westmoreland, Lanarkshire, Roxburghshire, Forfarshire, and Perthshire.

The surveys of the large towns of Glasgow and Dundee and many others have also been finished in the last year.

An outline map of London, on the scale of 6 inches to a mile, has also been made within the last few months. The one-inch map proceeds *pari passu* with the maps on the larger scale, and great advantage is derived from the system of making all the reductions from the larger to the smaller scales by the aid of photography; indeed, Lieut.-Colonel James expects to be able to get the ground sketched on the 6-inch impressions in such a way that, when reduced by photography, the reduced drawing will be the fac-simile of what the engraver is to produce.

The general reduction in the estimates of the War Department consequent upon the return of peace, has led to the reduction of the proposed grant for the survey for the present year to the extent of 27,000*l.*, and, as a consequence, the surveying force has been reduced to the extent of 3 officers and 600 men, the parties destined for the surveys of Cumberland, Stirlingshire, and the Western Hebrides, having been broken up.

Geological Survey of the United Kingdom.—Having directed the Geological Survey of the United Kingdom during the last two years, it becomes me to say a few words on the progress of a branch of the public service so intimately connected with geographical science. The first object contemplated by my predecessor, Sir Henry de la Beche, in founding this establishment, was so to colour the Ordnance or Geographical Maps as to convey a clear idea of the rocks beneath the surface in all parts of the kingdom, and further to illustrate such structural character by coloured sections, both vertical and horizontal. In this way, not only the order and succession of the strata are delineated, but the dislocations they have undergone are marked; whilst all the rocks of igneous origin which had been intruded among them are clearly defined.

As the work advanced, it became desirable, that these surveys and sections should be accompanied by volumes explanatory of the nature of the rocks, and their mineral and zoological distinctions, with descriptions and figures of the imbedded organic remains. To render the whole subject intelligible, it further became requisite so to expose the fossils collected by the surveyors, that the public might be led to understand the *rationale* upon which the maps, sections, and descriptions were founded. Thus, a

Museum having been established on a small scale in Craig's Court, with an attached experimental chemist and laboratory, it was decided by Sir Robert Peel, at the suggestion of my lamented predecessor, that the whole establishment should be enlarged and placed on a footing similar to that on which continental countries sustain such mineral and geological surveys. Then arose the Museum in Jermyn-street, which, from its origin, was constituted to be not only the central Map Office of the Geological Survey, where the fieldwork of the surveyors is laid down, compared, and issued to the public, but also a place where the proofs of the accuracy of such works might be accessible to every one. Collocating in it specimens of the building stones, marbles, granites, &c., of various districts, this museum was rendered still more useful by the addition of a Mining Record Office, in which plans of all the mines, abandoned or existing, are, as far as practicable, registered and kept, and various statistical documents brought together to show the whole mineral produce of the country. Lastly, to attain the same position as is occupied by the mining schools of France, Germany, and other countries, it was resolved to constitute within the new building a regular School of Mines, and to carry out in it (which had nowhere been previously attempted in Britain) a complete course of instruction in those physical sciences on which geology is based. The eminence of the gentlemen with whom I am associated in Jermyn-street, is the best guarantee for the success of an establishment in which youths can be thoroughly and systematically instructed in physics, mechanics, chemistry, metallurgy, mineralogy, mining, and geology.

My hearers will therefore understand, that the Jermyn-street establishment, having for its basis the geological and mineral illustration of the British isles, performs, at the same time, all the other duties to which brief allusion is here made, and must be viewed as a truly useful national undertaking.

The maps, which have been completed and published on the 1-inch scale with 6-inch horizontal sections, relate to the whole of Wales, all the south-western districts, and a great portion of the central counties of England; whilst vast tracts in Ireland have been surveyed and the information registered on maps of the 6-inch scale, and four counties published on the new 1-inch maps.

In Scotland also, progress has been made commensurate with the present force of surveyors, and there, as in Ireland, the data are

registered on the maps of the 6-inch scale, so as to be ready to be published, when the maps of the districts under review shall have been completed.

I have great satisfaction in informing you that, as the Geological Survey proceeds, the public is rapidly becoming aware of its value. The sale of the maps and sections has recently been doubled; so that, if the present demand should continue, the sale of this year will exceed 5000 sheets.

As no men of science are more directly concerned with the successful progress of the Ordnance Survey of the country, than the geologists who have to work out the subterranean phenomena upon the geographical features there laid down, so it may naturally be expected, that I should express my opinion on the *questio vexata* which has been so much agitated in Parliament, viz. the best scale for publication.

Most persons will agree with me in what I have long contended for, that a 1-inch scale* is large enough for the purposes of a general map, and any one who doubts it should visit the Museum in Jermyn-street, and there see how vast a portion of a lofty hall is required to exhibit at one view that portion only which is geologically finished, or Wales and the half of England. But, whilst for the general purposes of the public, this scale (which is larger than that of the *published* maps of France and other foreign countries) is quite sufficient, it is my duty to say, that for several objects of the geological surveyor the 6-inch map is often of higher value. This latter scale was applied to Ireland, because it was supposed to be the smallest measure on which every essential feature of a tract, whether natural or artificial, could be laid down. It follows therefore that, in availing himself of this map, the field geologist has at hand a datum-point for every observation; particularly if it be furnished with contour lines marking the relative altitudes. In short, he can register, with an accuracy unattainable, except on such a scale, every outcrop, fold, or break of the beds; and hence,

* See Memorial resulting from a resolution which I moved at the fourth or Edinburgh Meeting of the British Association for the Advancement of Science (1834) and presented to the Chancellor of the Exchequer (now Lord Monteagle) in May, 1835. Report of the British Association, Proceedings of the Meeting, p. xxxvi. This document, which showed the deplorable state of the Geography of my native country at that time, was also printed by order of the House of Commons. Subsequently, when President of this Society in 1853, I again made a strong appeal touching the neglect of Scottish Geography. — Journal of the Royal Geog. Soc., Vol. XXIII., President's Address, p. lxxxix.

independently of the advancement of the theoretical branches of his subject, and the acquirement of a sound knowledge of the substrata, he can essentially serve the purposes of the mining proprietor.

Having always held (as I still hold) that the 1-inch map is *the* publication which the country most requires, I am bound to record that my conviction of the utility of the 6-inch scale, for certain geological and mining purposes, is the result of an examination of the able surveys conducted on maps of that size under the guidance of Mr. J. Beete Jukes in Ireland and of Professor Ramsay in Scotland. I trust, therefore, that this larger scale will be maintained coordinately with the smaller one.*

PHYSICAL GEOGRAPHY.

Observations on the Summit of the Peak of Teneriffe.—Having spoken of the progress of practical geography at home and in our distant Naval Surveys, it becomes my agreeable duty to notice the uncommon British expedition proposed and executed last year by Professor Piazzzi Smyth, Astronomer-Royal for Scotland. During the last five years this zealous observer had endeavoured to impress upon Government, founded on his experience at the Cape of Good Hope, the eligibility of rising above the grosser stratum of our atmosphere, and had pointed to the facilities offered by the Peak of Teneriffe.

The Admiralty having finally listened to his arguments, and acceded to his moderate estimate of expense, Mr. H. Pattinson of Newcastle-on-Tyne added a powerful telescope to his instruments; and our associate Mr. Robert Stephenson, generously lent him his yacht for the whole voyage out from Southampton and home; whilst several leading scientific men were glad to have their favourite experiments tried in so novel a position.

The Professor established his first station on the Peak of Teneriffe, from the 14th of July to the 20th of August, amid the old trachytic lavas of the volcano, on a spot called Guajara, 8843 feet

* I say nothing here of the Survey on the 25-inch scale which is in progress in the richer tracts of Scotland and the north of England, because it contains no delineation of the natural features of the ground. Such surveys are not to be viewed as *Maps*, but simply as cadastral plans, which many eminent public men consider to be of the highest value for the conveyance and settlement of property, &c. They are also highly useful as Fortification Plans, and for *all such purposes of detail* they are, in my opinion, preferable to any smaller surveys.

above the sea. Here, above all the clouds, except a few scirri, which appeared about one day in five, he mounted the five-foot Sheepshanks equatorial, which revealed test objects of three magnitudes smaller than it had ever shown before. In the apparatus supplied by Prof. Stokes, the increase of black lines was remarkable as the sun's zenith distance increased, and there was a growth of the red end of the spectrum. The dryness was so great, that while the country below was covered by a dense bed of clouds, the average of the dew point was 40° . The sun's radiation exceeded the graduation of the instruments, the temperature reading $180^{\circ} + x$. The moon's radiation became perfectly sensible to Mr. Gassiot's thermo-multiplier, showing it to amount to one-third of the heat of a candle at the distance of 15 feet.

The second station was at Alta Vista, 10,710 feet above the sea; and there the twelve feet Pattinson equatorial was finally mounted, and by its space-penetrating power, stars of the sixteenth magnitude were easily seen, and the fractions of a second in the distance of double stars were defined. The colour also was observed. Only on one occasion could red prominences in the sun be suspected. Many other branches of observation were included, and minutely reported to the Admiralty. The breaking up of the season, after the middle of September, rendered a hasty retreat necessary, but with the conviction of a yet higher station being desirable in future, if only to get above the persecuting dust, a convenient site was marked at the height of 11,700 feet above the sea, still accessible to mules, if a little money were spent in removing some rugged blocks of lava.

Specific Gravity of Sea-water.—Our attention was recently called to the condition of the sea-water on the West Coast of Africa, when it was rendered more or less turbid to the distance of many miles from the mouth of the great river Congo or Zaire. Dr. James Campbell, F.R.G.S., of H. M. ship *Plumper*, observing this phenomenon, had the precaution to collect and send home, with a notice, various samples of sea-water taken at various distances from the shore, noting the day of collection, the latitude and longitude, and the temperature of the water and air at each of these spots. It became therefore a subject of interest to determine, if possible, the nature of the discolouring matter, and the relative specific gravity of the water in the different localities. Mr. Henry M. Witt, of the Government School of Mines, has had the goodness to examine, at my request, these samples of water, and his account of them will be published in

our next Volume. Unluckily the quantities of the water sent home were far too small to admit of rigid chemical analysis. Thus, in regard to the discolouring matter, it could only be ascertained, that it was a suspended, light, yellowish, flocculent substance, which affected the usual green colour of the sea, and is in all probability of organic (vegetable?) origin. The specific gravity, however, of the water has been determined, and the result, as will be shown in a table, confirms the observations of Mulder and Dr. John Davy, of a diminution of such gravity in sea-water as it approaches the mouths of rivers. Mr. Witt further mentions the results of other observers, and states, that after a series of experiments, in a voyage from Southampton to Bombay, MM. Adolf and Hermann Schlagentweit give 1.0277 as the mean specific gravity of the Atlantic; whilst our late member, Admiral Philip King, found the mean specific gravity of the Pacific to be 1.02648 between 10° and 40° s. lat., and 1.02613 between 40° and 60° s. lat. It would, therefore, appear probable, that whilst the density of inland seas, such as the Mediterranean, is higher than that of the broad oceans, the Atlantic will be found to have a higher specific gravity than the Pacific—a point, however, which ought to be ascertained accurately by numerous determinations of the quantity of saline matter in the waters of each of these oceans.—(See Smyth's 'Mediterranean,' p. 131.)

Permanent Effects of Winds and Currents.—By perseveringly observing the phenomena attendant upon the wear and tear of the coast of Caithness, and by pondering upon the changes that have taken place in and about the harbour of Wick, Mr. John Cleghorn, of that town, after pointing out that the south-west side of the harbour was comparatively shallow and its north-east deep, extended this observation, and found it to be true as respected other bays of the east coast of Scotland. The same observer, who had previously roused attention to the ruinous effects of the present system of fishing, in destroying the breed of herrings, and who has also written an able notice upon the formation of rock basins by the action of waves upon large stones (both derived from his own examination), was, in this case, led to believe that the natural cause affecting Wick harbour has been the long-continued prevalence of the south-west wind, which produced waves that had worn away the north-eastern headlands into precipices, and had sent back the débris by a counter or reflux current, which necessarily tended to shoal up the opposite or south-western side of the bay.

Consulting Mr. A. Keith Johnston, of Edinburgh, who had devoted many years to the accumulation of such data, Mr. Cleghorn found that his view of the prevailing south-west wind was correct, as respected all the region of the globe north of N. lat. 30° ; and hence he is naturally disposed to generalize the application of facts which are not only curious, but of value to the practical civil engineer.

An acquaintance with these data may, indeed, stimulate physical geographers to look into the general effects which have resulted from the continuance during a very long period of the same great dynamic force. In the mean time much inquiry seems to be called for. Mr. Findlay, to whom we are so much indebted for a perspicuous collection of all observations on tides and currents, whilst agreeing to the chief datum of Mr. Cleghorn, that the north-eastern shore ought, in our latitudes, to be the deepest, and the south-west shore the shallower, as due to the south-west wind governing the direction of waves which frequently have their origin at a distance of 1000 to 1800 miles from their effects, is not yet convinced of the truth of the other portion of the inference of Mr. Cleghorn, that the *débris* of the worn side is translated by a counter current towards the south-west. He reminds me, in a letter to myself, that the two circulating tidal systems, demonstrated by Dr. Whewell to exist in the North Sea, seem to explain the drift of silt from the extreme eastern shores of Britain to the Goodwin Sands and the Flemish Banks; whilst the *débris* abstracted from the south-west coast finds its way to the heads of the flow-beds in Morecambe Bay and the Straits of Dover, as shown by the tidal diagrams of Admiral Beechey.

As there is evidently conflicting evidence on this obscure part of the subject, and as the "*Flot du Fond*" of M. Emy * has been much disputed (M. Givry contending that wind affects the sea to no greater a depth than 10 fathoms, whilst Captain M. White extends that influence to 60 or 70 fathoms), we see how much additional observation is required before we can definitely judge the question with precision. If, by the examination of many other localities, the views of Mr. Cleghorn should be sustained, the generalization will be essentially serviceable in its practical application, and we may then be able to define the origin and progress of many large collections of drifted and alluvial matter, whether accumulated in

* *Du Mouvement des Eaux, &c.* Par le Colonel A. R. Emy. Paris, 1831.

remote periods, or now in progress. Once let the two points of this simple view be established, and we may extend the reasoning to those periods of change in the surface of the globe when, after the former sea-bottoms were raised up to constitute the mass of the present continents, great lines of cliff were formed in given directions, facing, as it were, broad, low tracts, covered by marine drift.

"How is it," said a native of the country to me, when I was formerly travelling in Russia, "that the Volga has always its right bank lofty and precipitous, and its left bank low?" The question was startling; but, in examining the rocks of the mightiest of European streams, I found that it was true, though the course of the stream varied more than the fourth of a circle in the two main directions which it followed. Descending along the high or right bank from Nijny Novogorod to Kazan, I did, indeed, speculate upon its having been the ancient shore of a sea which covered the lower country to the north; and if we adopt the law that the precipitous face was the side exposed to the waves, the prevalent wind in that region, at a period antecedent to the creation of the human race, must have proceeded from the north.

This phenomenon, of a precipitous face exposed to the north, continues from the confluence of the Oka and Volga on the west, to Kazan on the east, a distance of upwards of 200 miles. Throughout that space, headlands of red sandstone and marls stand out on the right bank, opposed, in a striking manner, to the low country on the left or northern shore. Again, whilst not a single northern erratic block is to be found to the south of this portion of the Volga, the low country, at a little distance to the north, is covered by those great erratics, all of which, as geologists know, were transported by ice-floes from the north, and dropped upon the bottom of a former sea. We may, therefore, naturally infer, that this east and west line of cliffs was formed during the icy period, when the great northern currents prevailed, the waves of which lashed against the hills extending from Nijny Novogorod by Tcheboksar and Sviask to Kazan.

On the other hand, when the same great stream turns abruptly to the S., and trends even to the S.S.W., a line of cliffs, still on the right bank, ranges from the bold headland of Carboniferous Limestone near Samara, and extends for about 550 miles to near Tzaritzin, facing the E.S.E. and S.E. Now, it is to be noted that, in front of this line of cliff, the low country on the opposite bank of the

stream was unquestionably occupied, at a very modern date, by a great internal sea, the desiccated shells of which, now lying on the steppes, are of the same species as those still living in the Caspian.

In these dried-up bottoms of a vaster Caspian, or what I termed "Aralo-Caspian,"* the erratic blocks of the north are no longer to be seen, and we are in a region where the right bank of the Volga has been fashioned into cliffs by the agency of winds and currents proceeding from a point of the compass very different indeed from that whence the winds and waves proceeded, when the cliffs ranging from Nijny to Kazan were formed.

In thus cautiously reasoning from data which are absolutely in our possession, and by extending the application of existing causes, we may be capable of determining the direction of the prevailing winds in different epochs of the earth's formation, and even in very remote geological periods; for many of the escarpments of ancient stratified rocks have doubtless had their prevalent direction of cliffs formed by the breakers and atmospheric agency of by-gone periods.†

Again, as we know that the ripples on the surface of the sands of the present shores indicate the direction of the waves, so when a sufficient number of observations shall have been made by Mr. Sorby and others ‡ upon the ripple-marks which have been preserved in the successive surfaces of stone, we shall be enabled to infer the direction in which the prevailing winds blew during each former geological period!

But I am now, perhaps, realizing too demonstratively for all my hearers, the truth of the incontrovertible axiom, that physical geography and geology are inseparable scientific twins.

* See 'Russia in Europe and the Ural Mountains,' p. 299, and the Geological Map, on which are noted the two points here contrasted, viz.—the southern range of the northern erratic blocks and the western boundary of the Aralo-Caspian Deposit.

† See the account of the formation of the '*Straits of Malvern*,' in Murchison's '*Silurian System*,' p. 530; and consult Professor Ramsay's writings on this point in his '*Memoir on the Denudation of England and Wales*,' '*Memoirs of the Geological Survey of England and Wales*,' vol. i. p. 333.

‡ See '*Edinburgh Phil. Mag.*,' New Series, vol. iii., p. 112, 1856. Mr. Sorby has particularly distinguished himself by his numerous observations on this subject, and has also explained his views by ingeniously contrived instruments of his own invention.

USEFUL INVENTIONS.

The Atlantic Telegraph.—At the head of the list of useful inventions in the course of application, must unquestionably be placed the Great Atlantic Electric Telegraph.

The series of nautical observations recommended for statistical purposes, in reference to the meteorology and physical geography of the sea, by the Maritime Congress held in Brussels in 1853, followed by the co-operation therein of the mercantile and governmental navies of the countries there represented; the subsequent writings and investigations of Lieut. Maury, U.S.N., founded largely upon those observations, and the soundings of Lieut. Berryman and others in the Atlantic Ocean, have determined the path which seems at present to be the only practicable one for successfully submerging a telegraphic cable beneath that sea, and so uniting Britain and America.

This path would appear to lie, in a straight line, nearly due east and west, between 48° and 55° N. latitude from the coast of Ireland to that of Newfoundland, along the course of which the depth of water is believed to be nowhere greater than 12,000 feet. The depth descends in gradual inclinations to that maximum, free from sudden chasms or subaqueous promontories; and upon a plateau at the bottom of the sea there is formed an agglomeration by the constant current of the Gulf stream, which proves, under microscopic observation, to be composed of the minute shells of Foraminiferæ and Diatomaceæ, and which, it is believed, will, in time, form a complete incrustation over the outer metal of the telegraphic cable.

It is singular that in no other part of the Atlantic than across this broad belt do conditions exist which, according to our present knowledge, would justify an attempt involving so much scientific interest, and so large a cost, as that of such a submergence of telegraphic wires.

To the southward of the Great Bank of Newfoundland, the bottom of the ocean suddenly recedes into vast and uncertain depths, due to some great former depression of the earth's crust, in many places unfathomed, which leave a channel for the Gulf-stream, along the whole of its course to the northward of the Gulf of Mexico. These depths continue, with intervals of abrupt and almost precipitous

breaks of elevation and depression, for half the distance eastward from the seaboard of the United States towards the coast of Portugal, and for as great a length in a north-easterly direction towards the coasts of England and Ireland. They are succeeded, in a direction due east, by the region of the Azores, where submarine volcanic action is constant, and where, owing to the deep soundings inshore and the absence of suitable bays or coasts in those islands, the secure landing and subsequent maintenance of the telegraphic cable would be very difficult and problematical.

With regard to the distance, it may be mentioned that a line from the nearest point on the coast of the United States, if taken direct, without touching at the Azores, would consume nearly 4000 miles of cable, and absorb considerably more than half a million of capital, and, that when laid, it would, in all probability, be soon abraded and destroyed, owing to the many and deep valleys it would necessarily have to bridge over along its course; while its great length would increase the difficulties and delay experienced in transmitting a current of electricity through very long circuits. Moreover, if carried by way of the Azores, using one of the islands as a relay station, the physical inequalities of the bed of the ocean would in no way be lessened in the western part of that route, and it would have the disadvantage of passing over a broader submarine volcanic region.

North of the coast of Newfoundland and Labrador, great difficulties also obviously present themselves. Vast masses of floating ice would, at all times, render the operation of laying a cable a most difficult, if not an impossible, undertaking, and even if landed, it would be liable to perpetual abrasion. The long and dreary tract of inhospitable country that would have to be traversed by land-wires, to complete its connection with the civilised portions of the American continent, would alone be sufficient to prevent its adoption.

These then are the considerations which led to the adoption of the route for laying the telegraphic wires across the Atlantic.

We now come to the means by which the electric current is to be transmitted. It is quite obvious that the great bulk and enormous weight of all previously manufactured submarine cables would preclude their use for a distance so great as that to which, it is hoped, the Atlantic Company are about to extend a successful operation. A form of cable had therefore to be devised, which should combine a maximum of strength with a minimum of weight, great flexibility with sufficient rigidity to allow of its being laid in a straight line,

a capacity of tension if needful to a moderate extent without injury, with cohesion sufficient to ensure resistance to a strain of considerable amount.

In the form of cable adopted by the Company,* it is believed that all these conditions are fulfilled. The conducting medium is formed by a strand of seven copper wires; six of these wires are wound spirally round the seventh, which latter is laid straight through the centre, and the diameter of the entire strand is somewhat less than the eighth of an inch. Around this strand are placed three separate layers of gutta percha, and thus the "core" is formed, which is about three eighths of an inch in diameter. Upon the core the appliances for sinking it and providing against the strain and abrasion incident to the paying it out into the Atlantic are laid. These consist of a soft bed of hempen twist saturated with tar, which is wound round the gutta percha core, and on the exterior of this is spun, in spiral continuity, eighteen strands of iron wire. This operation completes the cable, the total diameter of which is five-eighths of an inch, and the total length 2500 miles, or about a third of the earth's diameter. The total continuous length of the copper and iron wire employed in its manufacture will be 332,500 miles, and if extended in one line would therefore go fourteen times round our little planet.

The form of apparatus with which it is proposed to project the electric current through a conductor of such enormous length, has also been specially adapted for the purpose.

The connection of Great Britain with America by the means thus delineated will, it is trusted, be realized by the end of August in the present year. The magnificent United States' frigate *Niagara*, commanded by Captain Hudson, will ship her portion of the cable, consisting of 1500 tons, at Liverpool, and H. M. ship *Agamemnon*, under Master-Commander T. A. Noddall, will receive an equal amount off East Greenwich. They will then proceed to mid-ocean, when they will commence paying out the cable, the *Niagara* steaming towards the coast of America, and the *Agamemnon* returning to England. The *Agamemnon* has been preceded by the paddle-wheel steam-frigate *Cyclops*, for the purpose of taking soundings; and steps have been taken by the Admiralty to secure for naturalists all the materials whether animal or vegetable which may be brought up from the sea bottom. Let us

* I am indebted to Mr. T. Holdsworth Brooking, F.R.G.S., for these details. Mr. Bright is the able engineer of the Atlantic Telegraph Company.

then wish every success to this gigantic project, by which, combining the discoveries of Wheatstone with the ingenious contrivances of Morse and Whitehouse, the Anglo-Saxon race is determined to show, that not the broad or deep ocean can really separate the two great families of the same race and lineage.

Free-Revolver Stand.—A most ingenious invention, and one which must prove of great use to seamen, having been made by Mr. Piazzzi Smyth, was recently tested by that skilful astronomer in his outward voyage to examine the natural phenomena on the Peak of Teneriffe, which has just been alluded to. This trial demonstrated the entire efficacy of his newly mounted "Revolver stand for steadying a telescope at sea."

Notwithstanding the excessive rolling and pitching of the vessel, he kept the sea horizon in one unvarying position in the field of the telescope long enough for several persons to observe it in succession. The only addition required was a remedy for the third element of motion, arising from the azimuthal *yawing* of the ship's head, and this his mind immediately suggested to him for consideration during a subsequent voyage.

New Geometrical Projection of two-thirds of a Sphere.—Our associate Colonel James, the Superintendent of the Map Office, has presented to us a copy of his new geometrical projection of a sphere, and in an accompanying letter has explained the manner in which the projection is made.

Its peculiar feature consists in the fact, that by it we are enabled to represent two-thirds of the surface of the globe in a strictly geometrical projection, much in the same manner that a hemisphere is represented in the stereographic projections; but as two-thirds of the surface of the globe includes the entire continents of Europe, Asia, Africa, and America, and indeed all the habitable regions of the globe, with the exception of part of Australia and some of the islands in the Pacific, this projection gives a more accurate representation of the relative position of every portion of the habitable globe (with the above exceptions) than any other, and as the circles of the parallels of latitude, down to the parallel of 47° , are complete, the circumpolar regions are very accurately represented. Availing himself of this latter advantage in his new projection, Colonel James is now having maps of the stars made on it, in which the circumpolar stars will appear in their true relative positions to each other and to the other stars, which will be included in the same map.

This projection of our Earth will be found of great use in many

scientific inquiries, and particularly when employed for geological lectures, in which it is required to bring as large a portion as possible of the land of the globe under the eye at once, and in which such distorted projections as those of Mercator or Babinet cannot be satisfactorily used.

Metallic Boats.—Our associate Major Vincent Eyre having suggested the use of metallic boats for Arctic as well as other expeditions, our Vice-President Sir George Back has strongly recommended the adoption of them for every purpose of inland navigation and among ice. Their great superiority to boats of wood was, he reminded us, clearly indicated when Lieutenant Lynch in 1848 passed down the river Jordan, running through thirty or forty desperate looking rapids and cascades, and, though frequently striking against sunken rocks, they received no injury beyond a few indentations; whilst a wooden boat of the expedition was broken up and lost.

Bells on the Goodwin Sands.—Mr. George Chowen has suggested a plan of attaching bells to the buoys placed over sand-banks or rocky reefs, so that in heavy mists and storms when the mariner cannot discern the buoy, he may be warned off by the ringing of a bell, which will sound as long as the buoy is agitated by the waves. Leaving this matter for the consideration of our nautical members, the suggestion seems to me to deserve serious consideration; seeing that such bell-buoys might be advantageously used, not only on sandy shoals like the Goodwin Sands, but might, if found to work well, be placed on lines at a certain distance from dangerous rocky headlands on which so many wrecks occur, such as the Deadman and the Land's End in Cornwall.

France.—Among the many proofs of the prevalence of the good feeling now happily subsisting between our nearest foreign neighbours and ourselves, the proceedings of the Geographical Society of France offer striking examples. Thus we have seen the accomplished geographer M. de la Roquette zealously devoting his best energies to the publication of a sketch of the life of Franklin, and then coming forward generously with a large subscription to aid in the final search after the ships and crews of our illustrious countryman. Next we find the same liberal spirit evinced in the award of their annual Gold Medal to our own Livingstone.

When we turn from the general efforts of the Geographical Society of France to the works executed by the Imperial Government, we recognize a steady progress in the surveying and mapping

of all tracts, coasts, and bays to which the influence of France extends.

Through the obliging communication of Rear-Admiral Mathieu, the Director of the Charts and Plans of the Imperial Navy, a catalogue has been transmitted to us of all the works of that nature which have been published, or are in the course of execution, during the years 1856-57. Referring you to this list which will be published in the Appendix to our Volume, I may now simply state, that it comprises four charts of the rivers Gironde, Loire, and Seine, in France; seven of the coasts of Italy, from Genoa to the Tiber; three of the Black Sea and environs, one of which is a detailed plan of the Bosphorus, in three sheets; and no less than fifteen charts and plans relating to various parts of the Mediterranean, both on the African and Spanish shores, even up to Ceuta, Algesiras, and the Straits of Gibraltar. In the sequel, and in speaking of the absence of good maps of Southern Italy, it will appear that in her occupation of the Papal States, France has effectually supplied that desideratum.

If we turn to the far west, we perceive that our active allies have been vigorously surveying the coasts of that central region of America which now justly occupies public attention, and that Haiti, Bahia, and New Grenada have also come in for their share of exploration; whilst of Newfoundland, not less than ten plans of bays, havens, and islands have been completed. From Iceland on the north to China and New Caledonia on the south-east, we have numerous examples of that zeal and precision of geographical survey which has characterized the French geographers from the days of d'Anville and Cassini.

To five new plans of the ports and bays of New Caledonia, a chart of the Archipelago of Pomatou, and six charts and plans of portions of the coast of China, are to be added numerous works included under the head of "Nautical Instructions," which are of great value to all seamen. In the present list we meet with Illustrations of the Sea of Azov, Nautical Description of the North Coast of Morocco, Instructions for entering the Port of Alexandria, Manual of the Navigation of La Plata, Description of Passages between Luçon and the Main Islands of Japan, together with General Considerations on the Pacific, &c.

Spain.—This ancient kingdom, so renowned in history, has hitherto remained without a Trigonometrical Survey, though its surface is,

perhaps, more diversified and offers more attractions to the physical geographer than any area of similar extent in Europe. The Spanish Government is now, however, removing this opprobrium, through the agency of a commission composed of officers of the Engineers, Artillery, Staff, and Navy.

In 1854 the preparatory works were commenced for laying down the Trigonometrical Survey of Spain. The principal base line was measured on the plain near Madridejos, in the province of Toledo, and on the road to Andalusia, about 100 kilometres from Madrid. Its length is 14,480 metres. The first reconnaissances for several systems of triangles were made in the same year 1854, and in 1855 and 1856. One of these follows the direction of the meridian of Madrid, near which the primary base line is situated, and ends northwards in the neighbourhood of Motril, resting on the great mountain range the Sierra Nevada, and comprising in its network the towns of Ciudad-Real, Jaen, and Granada. Towards the north it is prolonged to Santander, including Segovia and Burgos. This chain is extended eastward, following the coast till it joins that of the triangles of the French Etat-Major on the Pyrenees, at the stations of Biarritz and Baigorry. This portion comprises the capitals of Bilboa and San Sebastian.

Another series is extended in the direction of the parallel of Madrid, and runs eastwards to the Mediterranean, resting on several points of the French triangulation made by Mechain and Delambre, and subsequently by Biot and Arago, for the prolongation of the meridian of Dunkirk, and taking in the chief towns of Teruel and Castellon de la Plana. Towards the west, this series passes by Avila, and for the most part following the direction of the Sierra de los Gredos, terminating in the interior of Portugal, on stations of the triangulation already made in that kingdom.

Another secondary series, leaving the last mentioned, has a northward course, terminating in the Cape Di Peñas, taking in Salamanca, Zamora, Leon, and Oviedo, all capitals of provinces. This chain is intersected perpendicularly by another which commences from that of the meridian of Madrid, to the south of Burgos, and runs westward, taking in Palencia, and following nearly the northern boundary of Portugal, until it reaches the sea near Vigo.

Another secondary chain of triangles has been similarly projected, which rests on that of the parallel of Madrid eastward, and stretches northward to Pampeluna, to connect itself with the French triangulation of the Pyrenees, passing by the Moncayo and between

Saragossa and Soria. This chain has a branch which runs westward between the towns of Soria and Logroño.

In the early part of this year (1857) the instruments arrived for the definitive measurement of the fundamental base line, which will probably be effected immediately. Of late years, the Corps of Engineers has continued the survey of the fortifications and their environs with great minuteness and precision, whilst the Etat-Major has executed military reconnaissances of the principal lines of communication and of the battle-fields of Spain. The works carried out by the engineers of "Ponts et Chaussées" and other persons concerned in projecting roads, and especially railroads, have produced some interesting geographical details, especially with reference to the inequalities of the surface.

The commission formed for making the geological map of the Province of Madrid has zealously continued its labours in it and in the surrounding districts. Some of its Members, moreover, have made some interesting reconnaissances and surveys in the mountains of the provinces of Palencia, Santander, and Leon, which will be continued throughout the length of that great mountain range.

In the course of 1856 our correspondent Colonel Coello published maps of Almeria, Orense, and Pontevedra, and the supplements of Leon, Caçeres, and Badajoz. The engraving of the maps of other provinces, by the same accomplished geographer, is far advanced, and in 1857 the remaining reconnaissances may, it is hoped, be finished.

Some memoirs and articles bearing upon the geography of Spain have also been published, both in separate papers and in the scientific journals, the 'Revista Minera,' the 'Memorial de Ingenieros,' &c.

M. A. de Linera has completed a small work upon the Sierra Nevada. M. Rojas Clemente had, half a century ago, fixed the height of the peak of Mulahacen at 3555 metres, an altitude which has been adopted by the Bureau des Longitudes of Paris. From new measurements it appears that this peak is only 3399 metres high; and hence the peak of Nethou, in the mountains of Venasque, in the Pyrenees, and near the French frontier (3405 metres), would seem to be the highest point in Spain.

Between the Pyrenees and the Sierra Nevada there are three other very considerable mountain groups. 1st. The Sierra de los Gredos, the highest peak of which, or Plaza de Almanzor, reaches to 2630 metres, according to the trigonometrical measurements of M.

Subercase. 2nd. The Torre de Cerredo, one of the celebrated '*Picos de Europa*' between the Asturias and Leon. According to the observations of M. Casiano de Prado the mountain is 2668 metres high, and is composed of Carboniferous Limestone. 3rd. La Sierra Sagra de Huescar, on the borders of Andalusia and the kingdom of Murcia. According to the observations of MM. de Verneuil and Collomb, * this lofty mountain (2400 metres) is composed of Jurassic Limestone.

That indefatigable explorer and sound geologist, M. Casiano de Prado, aware that he could not adequately express those geological discoveries which he is continually making in his native land, if unprovided with good geographical data, has himself surveyed the province of Palencia, of which, in the course of the year, a map will be published exhibiting all the geological as well as geographical features of that interesting tract. M. Casiano is also continuing his researches in a more southern region, and is preparing a map of the province of Leon.

M. Vezean, a young student of Montpellier, has, it appears, published a geological map of the environs of Barcelona, the data of which are spoken of favourably by M. de Verneuil, as having been laid down on a local survey, which contains many corrections of pre-existing maps.

I cannot conclude this notice of the progress of geography in the Peninsula, without reminding you of the great value of the researches of my dear friend and old companion in Russia, Sweden, and Germany, M. Edouard de Verneuil, one of the most distinguished members of the French Institute.† During several consecutive years this eminent geologist and palæontologist has so laboured, entirely at his own cost and unaided by any government, that he has not only thrown a new light upon the internal structure of large regions of Spain, but has, by careful barometrical measurements, determined the heights of many of the most lofty mountains, and of localities equally important to the geographer and naturalist as to the geologist, all of which were previously unknown.

Switzerland.—The very able notices on the progress of Swiss geography, which have been received by the Secretary from our

* See *Tableaux Orographiques* par MM. de Verneuil, E. Collomb, et de Lorière, Bull. Soc. Geol. de France, 1854, and *Comptes Rendus*, tom. xl. 1855.

† The account of the progress of geography in Spain I owe to M. de Verneuil, who obtained the details of the Government Surveys from Colonel Coello, whose maps, above alluded to, are to be added to the great statistical work of M. Madoz.

distinguished correspondents Chaix and Ziegler, will be noticed in an early publication, and reviewed at the next Anniversary.

Italy.—The most important contributions to geography during the past year have been the continued publications of the great Government Surveys in Piedmont and Central Italy.* The Piedmontese survey, on a scale of $\frac{1}{500,000}$, is nearly completed, and upwards of forty sheets have been already given to the public.

My predecessors in this Chair and myself have had occasion to allude to the Austrian Survey of Central Italy, perhaps the most important work of the kind connected with Italian topography. I am happy to announce that this great work is now completed—the last sheets embracing the mountainous region of the Marci, Hernici, Volscii, and Sabines, on the Roman and Neapolitan frontier. The *Carta Topografica dell' Italia Centrale*, in fifty-two sheets, embraces the whole of the Tuscan and Roman States, on a scale of $\frac{1}{500,000}$, and forms a suite to the elaborate surveys of the Lombardo-Venetian kingdom, and of the Duchies of Modena, Massa, Carrara, Parma, and Piacenza, published some years before by the same Government. A reduction of the *Italia Centrale*, in four sheets, is now in progress at Vienna.

Rome.—The wish so long felt by every antiquary, geographer, and geologist, to possess a good map of the environs of Rome, has been at length satisfied by the publication of the elaborate survey, undertaken by the officers attached to the French Army of Occupation, and of the last sheets of the Austrian map of Central Italy. The French map, in four large sheets, has just been completed, and is in every respect worthy of the *Dépôt de la Guerre*, from which it has been issued. The scale is the same as that of the great Trigonometrical Map of France, $\frac{1}{500,000}$; it embraces all the Roman territory between the parallels of $41^{\circ} 30'$ and $42^{\circ} 20'$, and as far east as the meridian of $12^{\circ} 55'$ east of Greenwich, consequently the most interesting parts of Southern Etruria, of the Sabine territory, and of Latium, in the vicinity of the capital of the Roman world. The topographical details are beautifully laid down; those of the volcanic group of the Alban range are in this respect remarkable. Two advantages of the French Survey over the Austrian, consist in having the heights of the principal localities marked, and their ancient names annexed. The Roman Government is now preparing a map of the

* For these details respecting the geography of Italy, I am indebted to my gifted friend Mr. Pentland.

environs of Rome, nearly upon the same scale as the French Survey, upon which will be laid down the principal estates of the great landowners; and M. Rosa, a very laborious topographer, who has already surveyed in great detail many of the most interesting districts around the Eternal City, has just completed a very beautiful map of the Alban hills, on the eve of publication by the Roman Topographical Office (*La Direzione del Censo*).

In the posthumous work of the late eminent Antiquary, Architect, and Topographer, Commander Canina, are contained several maps and plans of considerable interest in a geographical point of view, amongst which the revised edition of his great map, in six sheets, of the Campagna of Rome, of the Upper Valley of the Anio, with detailed plans of the most remarkable ancient towns and classical sites of the Alban Lakes, and the ancient ports of Centumcellæ, Portus Trajani, Ostia, Antium, &c. &c. Connected with our pursuits may be mentioned the detailed statistics of the Roman States (*Statistica della Popolazione dello Stato Pontifico*), just published by the Papal Government.

Naples.—I am not aware that any progress has been made by the Government of this country in the great Survey of the kingdom, inaugurated by our late Associate, General Visconti.

The French Dépôt de la Marine, having obtained the consent of the King of Naples to prolong its hydrographic survey of the West Coasts of Italy, beyond the Neapolitan frontier, M. Darondeau has been able, during the past year, to complete it as far south, and including the Bay of Naples, the Ponza Islands, &c. This, with the survey of the Roman Coast, is terminated, as my friend Mr. Pentland tells me, and will form a worthy complement to the great survey of the coasts of Italy, commenced in 1841, and which extends from the mouth of the Var to the Island of Capri. M. Darondeau is now engaged in rectifying the charts of the Lipari Islands, in the position of some of which errors of importance have recently been pointed out.

Island of Sardinia.—General A. della Marmora has completed his labours on the Physical Geography and Geology of this interesting island, by publishing the last volume of his great work, containing geology and descriptions of the fossils, by the eminent palæontologist, Professor Meneghini, of Pisa. As General Alberto della Marmora (brother of the Sardinian commander-in-chief in the Crimea) has devoted the best years of his life to the accomplishment of this ar-

duous task, I have sincere pleasure in recording my hearty approval of a work, in which he has united the powers of a skilful physical geographer with those of an indefatigable geologist.

GERMANY.

The progress of geographical science is now so well promulgated through Germany by the 'Mittheilungen' of Dr. Petermann, that it is unnecessary I should do more than call attention to the value of this methodical and well-illustrated monthly Periodical. In it are to be found accounts not only of what is written or recorded in the Geographical Societies of Berlin, Vienna, and other cities, under the guidance of a Humboldt, a Ritter, and a Haidinger, but also reports of descriptions of newly-explored countries in various distant regions, accompanied by well-executed maps.

Aware that a certain amount of discontent has sometimes been expressed, at the appearance for the first time in this German work of the voyages and travels of individuals who have been, or are in the pay and service of Britain, I would beg my associates to consider, how natural is the feeling of any foreign traveller engaged in the British service, to wish to see the outline of his researches first made known in his native land, and how his countrymen on their part should feel a just pride whether in perusing or in publishing the writings sent home to them in their vernacular freshness from remote corners of the earth, with which they are necessarily less familiar than the people of a maritime country like our own.

Whilst then there have occurred examples of the publication of the outline of travels of English agents for the first time in German, which might have been previously noted in the Proceedings of our Society, as coming from the Secretaries of State who are our Associates, and who usually send to us their earliest communications respecting foreign travels, I would earnestly deprecate anything approaching to a feeling of uneasiness upon this subject.

Contented with the reflection, that knowledge cannot be too widely diffused, let us hope that our German friends, clearly recognizing and honouring the British channels through which their information is obtained, will always work harmoniously and in unison with us. Banishing therefore all jealousy, and admiring the perseverance and skill of such contemporaries, I am bound in fairness to say, that the 'Mittheilungen' is exercising a powerful and salutary influence on the progress of our science; and as the spi-

rited proprietor of this Periodical, M. Justus Perthes of Gotha, has spared no expense in bringing out the work in an attractive form, so I rejoice to hear that its sale is becoming very large—upwards, as I am told, of 3000 copies being in monthly circulation.

The advancement of our science in Prussia has, I am sorry to say, received a serious check in the recent decease of Dr. Gumprecht, the Editor of the 'Monats-Berichte' of the Geographical Society of Berlin, who, after successfully prosecuting some branches of geology, had devoted himself with great energy to the extension of our acquaintance with the geography of Southern Africa. But what is most deeply to be regretted is, that he was suddenly carried off when engaged in a great and important work on the geography of Germany, a subject, on which I hope, through the assistance of my friend M. Ritter, to be better enabled to speak at our next Anniversary.

In this brief and very imperfect notice of the progress of geography in Northern and Central Germany, I have great pleasure in specially acknowledging the accession to our collection of many valuable maps published by the Bavarian Government, which have been communicated to us through His Excellency Baron de Cetto.

Of the distinguished travellers Schlagintweit it is my province to speak in a notice of Asiatic discoveries.

Austria.—Endowed with various noble establishments for the advancement of science, possessing many good geographers, and publishing most admirable maps of the different parts of her empire, Austria was without a Geographical Society until the 21st of September of last year. It was then that my valued friend William Haidinger, long known as an eminent mineralogist and geologist, and much esteemed by his contemporaries in every land as well as in his own, uniting with a few zealous friends, and obtaining the consent and protection of the Government, established the Imperial Geographical Society of Vienna. To a great extent this body, like that of St. Petersburg, is founded on the model of our own Society, though the regulations and interior management necessarily vary with the different form of the Government of the country.

In speaking of the Proceedings of this Society, I cannot avoid specially alluding to one point of the proceedings of our Austrian friends; namely, the recent departure of the Imperial frigate the Novara on a voyage of scientific exploration round the world. When this expedition was decided upon, and a number

of able men were chosen, to form its scientific staff, the President of the Imperial Geographical Society having applied to me, and explained its object, I had real gratification in writing letters of introduction to all the authorities, with whom I was acquainted, at the places which this frigate might visit. Admirably organised, the expedition has enjoyed the great advantage of having had its officers furnished (as M. Haidinger informs me) with the minutest instructions of the venerable Humboldt, whether upon the magnetic equator, the magnetic curves in the different oceans, the lines of no deviation and equal intensity, or on cold and warm currents, particularly those along the Peruvian coast, and on the tropical East and West counter-currents. The great traveller has also enjoined the cutting of marks on the rocks, to register the actual mean level of the sea, the same practice which he had formerly recommended for adoption on the shores of the Caspian; and he has especially urged the collection of specimens from the active volcanos of South America, which he has enumerated *seriatim*, with a view to a correct classification of such igneous products, which he believes will be found to exhibit an arrangement in separate linear masses.

If I may judge of Dr. Scherzer and the other gentlemen who accompany him by the encouraging example of his associate Dr. Hochstetter, the geologist, who visited this country to obtain from General Sabine information and instruction in making magnetical observations, I can have no hesitation in saying that this first effort of Austria to circumnavigate the globe will produce a harvest worthy of that ancient empire, and will reflect the highest credit on the new-born Geographical Society of Vienna.

Russia.—With the return of peace, which has happily taken place since our last Anniversary, it is most gratifying to one who has been so long connected with the science of Russia as myself, and who has been so heartily welcomed in that Empire by all persons, from the Emperor to the peasant, to be enabled to recur to the geographical labours of those old allies of our country, to whom I am naturally much attached.

Whilst the late war impeded all scientific communication with the countries of the West, Russia was steadily advancing researches of the highest importance to physical geography in her distant and slightly known territories, and particularly on the north and east. The great expedition to the northern part of the Ural Mountains, under the conduct of Colonel Hoffmann, had indeed obtained, before the war, the active support of the Imperial Geo-

graphical Society, and of its President the Grand Duke Constantine.

The second volume of the work descriptive of this long and laborious enterprise has recently been published; the first part, by Krusenstern, having already been made known to geographers. This second volume specially relates to the 'Pae-Khoe,' or Rocky Mountains, and has completely satisfied the expectation of naturalists, physicists, and geologists. The historical and geological portion by Hoffmann; the classification and description of the fossil organic remains by Count A. von Keyserling, my distinguished coadjutor in earlier days; and the descriptions of the minerals by Gustaf Rose; of the animals by my colleague of the Imperial Academy, Brandt, and of the flora by Ruprecht, together with meteorological, physical, and hypsometrical observations, are all of a high order of merit. The exploring parties examined the principal chain of the Ural, north of Petropaulovsk, from the sources of the river Petchora up to the highest northern peak ($68\frac{1}{2}^{\circ}$ N. lat. and $66\frac{1}{2}^{\circ}$ E. long.), which, hitherto nameless, had been termed by this expedition Konstantinov Kamen, in honour of their geographical president, his Imperial Highness the Grand Duke Constantine. Westward from this point runs another mountainous ridge, the Pae-Khoe; continuing in a W.N.W. direction, and running parallel to the northern coast as far as Vaigats Strait. The highest point of it is the Pue-daia, and the geological structure proves that the Pae-Khoe is not, as hitherto supposed, a continuation of the Ural.

The average height of the northern Ural is about 3000 (the Töll Poss and Sablja are above 5000) feet. Patches only of snow are visible on some mountains, but no lasting covering of it is seen at 68° N. lat.; although, as Leopold von Buch remarks, snow is found in Norway at 67° , and at a height of 3800 feet only. The volumes in which these important explorations are described, are characterized by a minuteness of detail, on all branches of science within the scope of the undertaking, which entitles the work to rank as one of the most valuable scientific publications that Russia has ever produced. The accompanying map is of great use to practical geographers, and a marked addition to the pre-existing geography of Europe.

The efforts of the Imperial Geographical Society to diffuse an adequate acquaintance with our science throughout the interior of Russia have been most commendable. Thus, this body not only publishes volumes and bulletins like our own, but also translates

into Russian, useful standard works, including those of the celebrated Carl Ritter, and brings out catalogues of the geographical maps of Russia, as well as reviews of geographical, statistical, and ethnographical labours. Even the commerce of the interior comes within the scope of our vigilant rivals, whose Society was founded on the model of our own.

The most extensive scientific exploration which the Society has ever undertaken, is one which is still in progress, or that of Eastern Siberia. Its object is to examine and determine, by astronomical and trigonometrical observations, the geographical features of the vast region between the Lena and the Vitima, and also of the southeastern tracts beyond the Lake Baikal. The chief astronomer, M. Schwartz, has under his direction MM. Oussoltzoff and Sminia-guine, and is accompanied by the artist and academician Meyer, and by M. Radde the naturalist.

The results of the first year's labours are given in the 'Compte Rendu' of 1855, edited by M. Lamansky, and there can be no doubt that geographers will soon possess not only a correct delineation of these remote regions, but also striking and characteristic sketches of the scenery of all the border frontier regions of Siberia—a map of the river Amur having been already published. Among the great feats of our contemporaries, I learn that MM. Semenoff and Wasiljin have made known the existence of an extinct volcano near Mergen, in Manchuria, which was in activity in the year 1721; and that the mountain of Demavend has been ascended by M. Khanikoff.

In writing to me of these explorations, and of a remarkable expedition to the Lake Issingul, my illustrious friend Humboldt thus expresses himself:—"On the northern side of the great volcanic chain of Thian-Chan, they have, it is true, discovered plutonic rocks only, such as granite and gneiss, and along the edges of the great bitter lake of Central Asia (Issingul) no trachytes (volcanic rocks) have been seen; but it must not be forgotten, that from the eastern shore of that lake to the Volcano Peschan (the most western of the volcanos of the Thian-Chan, or Celestial Mountains) the distance, in a straight line, is not less than 250 English miles."

In reference to Eastern Siberia and those vast tracts of Central Asia which lie between the defined boundaries of the Russian and Chinese Empires, let me say that the English public will soon have presented to them a work containing the most vivid and remarkable

pictorial representations from the pencil of their countryman, Mr. J. W. Atkinson.

Under the patronage of the Emperor Nicholas, Mr. Atkinson devoted seven years of his life to the exploration and delineation of a region, of the greater part of which no European had hitherto obtained the slightest knowledge. Let my associates inspect the large original water-colour landscapes by this artist, representing the marvellously tinted and wild rocky countries of Mongolia, the great Steppes of the Khirgis and Chinese Tartary, including views of even the snowy Thian-Chan, of which reduced engravings will soon be published, and they will readily admit, that if such sterile, igneous, rocky masses, should not afford gold or silver, they can prove of little value to any civilized country.

Among the subjects treated by the Russian geographers during the year 1856, the mere enumeration of the following works, which constitute a very few only of the communications to the Imperial Society, will show the importance of its labours:—The Geography of Vegetables, in four vols., by M. Béketoff; the Fauna of the Mouth of the river Amur,* by Schrenck; a new Ethnographical Map of Europe, by Koeppen; the Geographical and Ethnographical Terminology of Central Asia, by Stehoukine; Report of Lieutenant Oussoltzoff of a Voyage to the Sources of the River Vitima; and an account of those Volcanos of Central Asia, by Semenoff and Wasiljin, to which allusion has just been made.

Asia Minor.—In February of this year, I had the pleasure of communicating to the Society a memoir, which I had received from General Jochmus, relative to a proposed communication in Asia Minor between the Lake of Sabanja, the River Sakaria, and the Gulf of Nicomedia. The utility of this project had been fully recognized in ancient times, and the question has been several times agitated, at widely different periods, up to the close of the last century. The distance from the River Sakaria to the Lake of Sabanja, between which there already exists a natural communication by the little river of Sari-deré, is not much more than three miles and a half; and from the Lake to the Gulf of Nicomedia it is scarcely nine miles, whilst no difficulty exists on the score of difference of level. There can be no doubt that such a system of canals, of sufficient width

* See p. 406 *ante*, for a notice of the hydrography of the river.

and depth to admit of the passage of coasting-vessels and small steam-boats, would open up valuable internal communication for the ready supply to Constantinople of wood, charcoal, and the most necessary articles of daily consumption.

Persia.—During the present session, whilst our country has been temporarily engaged in hostilities with Persia, it has been our good fortune to have present amongst us our distinguished medallist Sir Henry Rawlinson, who has enlivened our meetings by his agreeable and instructive lessons on the geography of countries with which he has made himself so intimately acquainted. By his extensive personal knowledge of the East, united with those varied attainments in classical and Oriental literature, which have made his name distinguished throughout the world, Sir Henry has been enabled not only to communicate to us information of the most important nature with respect to the modern geography of Southern Persia, but also to illustrate that information from the rarer resources of his own especial studies in ancient history. With respect, moreover, to the recent movements of our army in Persia, the strategical knowledge of Sir Henry has added a peculiar interest to his observations on the country where they have taken place. I cannot refrain from congratulating you, at the same time, on having had the advantage of two such able and experienced commentators on these interesting and important subjects as General Monteith and Mr. Layard.

In summing up the results of the information we have thus gained, I will here confine my remarks to that which is essentially geographical. The most striking points to which our attention has been drawn, in this respect, are the changes produced in the channels of the rivers and on the coasts immediately proximate to their embouchures. These important facts are worthy of especial notice, both in a prospective and a retrospective sense, since they will materially modify our calculations in the more doubtful reading of early history, and our judgment as to calculations with respect to the future condition of these coasts. The agents of these changes are clearly intelligible. There are but two winds which prevail in the Persian Gulf—the north-west and the south-east, and, when the latter sets in, the whole force of the Sea is brought to bear directly against the current of the Euphrates, and hence an enormous deposit of the alluvium brought down by the stream is effected, thus barring up its mouth. This deposit, constantly on the increase, progresses, by Sir Henry's calculation, at the rate of a mile

in the lapse of thirty-five to forty years. An example of the effect of this agency in by-gone times is adduced in the fact, that a great city, of which the ruins are to be seen above Mohammerah, was an island in the time of Sennacherib, named Billat, and can be shown to have been still an island in the time of Alexander. At the present time it is sixty miles from the embouchure of the river, and a succession of cities can be traced upon the desiccated delta below it, along the river, down to the sea.

A question of essential moment has also been explained by Rawlinson as to the frontier line between Turkey and Persia,—a point upon which our maps have been greatly wanting in correctness. The real line of frontier—as determined by the Commission of Delimitation, appointed under the provisions of the Treaty of Erzerúm—comes down to Mohammerah, and then follows the course of the Euphrates to the sea. It was agreed that the country watered by the Euphrates belonged to Turkey, and the country watered by the Karun to Persia; but the question was, whether Mohammerah was on the Euphrates or on the Karun. It was decided that the place should be considered to belong to Persia, but as according to Sir Henry's belief it is situated on the Euphrates, this decision would seem to be contrary to geographical accuracy.

Thibet.—Early in this year some extracts were read to the Society from the memoir of a journey across the Kuen-luen from Ladak to Khotan, communicated by Colonel Sykes from the brothers Schlagintweit, already so well known to geographers and naturalists by their labours on the physical geography and geology of the Alps.

These accomplished gentlemen, who travel by the desire of the King of Prussia, and at the suggestion of Baron Humboldt, have been employed, under the patronage of the East India Company, in the physical survey of the distant trans-Himalayan regions. The extracts communicated to us, form a small portion only of the information they have sent home, but from some brief allusions to the groups of hot springs near the Kiok-Kiul Lake and the Valley of the Nubra, we may feel assured that, when all their memoirs are published, they will be found replete with curious observations on many subjects; and specially on those mineral springs to which Humboldt long ago invited attention, as proofs that the Kuen-luen was of volcanic origin.

The brothers Schlagintweit have laid down the entire orography of Kemaun. M. Adolf Schlagintweit, after visiting the glaciers of

Pindari, was joined by his brother Robert; and they examined together the glacier of Milum, which surpasses in extent all those of Switzerland. It is from 8 to 10 miles in length, and 3000 feet broad. The mountains which surround this glacier consist of crystalline schist, covered by fossiliferous strata of the Silurian age. The two brothers have also measured the height of Nanda Devi, an insulated peak surrounded by deep precipices, at the foot of which is the glacier of Pachou.

But rather than attempt, on my own part, any sketch of what these distinguished German travellers have accomplished, I will here quote to you, from the pen of Humboldt himself,* a short summary, which he has sent me, of their remarkable explorations.

“Hermann and Robert Schlagintweit,” says the Baron, “have had the proud satisfaction of passing in August, 1856, the chain of the Kuen-luen mountains, and of reaching Eltschi in the province of Khotan. As I am vain enough to believe that my map of Central Asia (the result of five months’ labour, in bringing together the detailed accounts of the Buddhist priests Fahian and Stenan-thiang, with those of Marco Polo, Wood the explorer of the Pamir, Burnes, Vigne, together with the excellent sources of information supplied by Klaproth and Stanislas Julien) represents more faithfully the formation of the ground than the other maps in your possession, the range of which beyond the Himalaya is mythologically doubtful, I invite you to examine it before you read or rather try to decipher these lines. A botanist of the highest merit, Dr. Thomas Thomson, who, conjointly with my excellent friend Joseph Hooker, published in 1855 the ‘Flora Indica,’ says in the Introduction Statistique, p. 215, ‘The chain of the Kuen-luen, where it forms the northern boundary of Western Thibet (where Dr. Thomson resided a considerable time), is as lofty as the Himalaya.’ *Its axis has not been crossed by any European traveller*, but has been reached by Dr. Thomson, who visited the Kara-korum pass, elevated 18,300 feet. This testimony will show you the importance of the success of the brothers Schlagintweit. On the morning of the day, on which they crossed by the Kara-korum pass, they met a caravan coming from Yarkand, and near the salt lake of Kiok-Kiul they found the hot springs of Panamik and Tchanglung, with a Centigrade temperature of 74° 2’ and 78°, and on an immense plateau at altitudes of from

* For the letters of the brothers Schlagintweit, communicated by Baron von Humboldt, see also the Berlin ‘Zeitschrift der Allgemeiner Erdkunde’ for 1856, pp. 532, 551.

16,800 to 18,000 feet, they had to endure a degree of cold at their nightly bivouac of $11^{\circ} 4'$ Cent. below freezing point. Fahian, at the close of the 4th century, writing of Bushia south of Eltschi, the capital of the province of Khotan, praises its high cultivation; its elevation being not more than 9200 feet. 'We were at a day and a half's journey,' say the Schlagintweits, 'from the northern part of the high chain of Kuen-luen. After leaving Sumgal, we travelled for three days along the banks of the Karagash, which gave us an opportunity of inspecting the famous quarries of stone called Yaschem, which people come from a great distance to visit. Between Kara-korum and the Valley of the Nubra we measured several mountain peaks above 24,000 feet of absolute elevation. The dip of the magnetic needle between July and September is registered in figures.' The geological excursions of Adolf and Robert Schlagintweit in Eastern Thibet by Niti and Gertope, to the glacier of Ibi Gamin, have also been very important. The travellers reached it on the 19th of August, 1855, and trusting to the corresponding observations in Agra, fixed the height they attained on Ibi Gamin at 22,260 feet = 20,886 French feet. This is not only higher than I reached at Chimborazo (18,096 French feet) in 1802, and which Boussingault made (18,480 feet) in 1831, but it is also higher than the summit of Chimborazo itself, which I found by trigonometrical observation to be 20,100 French feet in height. As the Schlagintweits were the first who reached the top of Monte Rosa, they are accustomed to this kind of expedition. A portion of their magnetic observations of the Himalaya has been printed separately at Calcutta, and my respected friend General Sabine will doubtless give them due credit for their assiduity. They have also made some interesting and delicate observations on the influence of great heights on the variation of the magnetic needle. They will bring back to England some beautiful geological collections, perhaps even in the course of this autumn; for you are aware that by the munificence of the East India Company and the generous kindness of Colonel Sykes, who is a noble advocate of every thing which appertains to the sciences, the brothers Schlagintweit have received every encouragement."

When I reflect that these brothers have penetrated farther into Thibet and Tartary from the plains of India on the south, than any other European, that their physical, geological, and geographical observations are of the highest value, and that they have even made photographic sketches at heights of 20,000 feet above

the sea, I cannot but rejoice, that these élèves of the great traveller of the age, should have performed journeys, which have elicited from that illustrious man, now in his eighty-seventh year, the expression which I have read to you, reminding us of the best days of the explorer of the Andes and Siberia.

BORNEO, BURMAH, AND CHINA.

Borneo.—Our Associate Mr. A. R. Wallace has supplied us with some important corrections of the north-west portion of the map of Borneo, derived from his observations in a journey up the Sadong River. From his account we gain valuable additions to our information respecting the physical geography of that vast island, together with some very interesting comparisons, bearing on the ethnological similarity between some tribes of the Dyaks and the Indigenes of the valley of the Amazon. Amid the uncertainty which hangs over the history of the migrations of various branches of the human family in remoter periods, these notices of distinct resemblance are of especial moment; and in the present instance the observations of Mr. Wallace are confirmatory of the views of Dr. Latham and others, who regard the Americans as Mongols who have emigrated direct from Eastern Asia.

A further exploration of this important island has been set on foot during the past year by Lieut. C. A. C. de Crespigny, R.N. Great importance must be attached to the investigation of the resources of this vast country, which is already known to be largely productive of some of the choicest desiderata for the advancement of civilisation. As a mineral country it is, according to Mr. John Crawford, perhaps the richest in the East. Gold, coal, antimony, iron, caoutchouc, and gutta-percha, have already been derived from it in abundance; and who shall say what further discoveries may lie open to the search of a skilful explorer? The geographical position of the island moreover, lying, as it does, in the direct route between China and Australia, presents an additional stimulus to the development of its unknown resources.

It is satisfactory to know that our Medallist, Rajah Brooke, has been anxiously occupied in developing various branches of industry within the range of his jurisdiction at Saráwak, among the most important of which must be classed the opening of coal-mines; and it is indeed a matter of sincere congratulation that he should recently have escaped from the imminent danger in which he was placed by the late insurrection of the Chinese settlers.

Burmah.—We are indebted to Captain Yule, of the Bengal Engineers, who had been sent by the Indian Government to Amarapura as secretary to Major Arthur Phayre, for a most valuable communication on the geography of Burmah, with an illustrative map of that country. Captain Yule has compared and brought together with great ability the various valuable surveys of several of his precursors in different parts of this extensive field of operations. His principal materials were a Survey of the new British Province of Pegu, by Lieut. Williams of the Bengal Engineers, still in progress; a New Survey of the Province of Martaban, by Mr. Hobday; a Survey of the Irawady to Ava, by Captain Rennie and Lieut. Heathcote of the Indian navy. Besides these data, Captain Yule contributes his own sketch of part of the Aracan Yoma range and its passes, and a rearrangement of the Chinese frontier and the Laos States east of Burmah, as taken from the Route Surveys of Dr. Richardson and Captain McLeod. A considerable error in the longitude of the Irawady at Prome, and the higher parts of the stream, as assigned in previous maps, is pointed out. This error, which, in 1853, Captain Yule had indicated as probable, in a Memoir on the Passes of the Yoma, has been confirmed by the surveys since made. The geological portion of the work by Mr. Oldham, the Superintendent of the Geological Survey of India, affords much important information respecting the structure of the country, the rocks, and their relations; and renders the publication additionally valuable by the observations it contains on the statistics of the productions of the country, including certain mineral substances described by that good geologist. This work, which was printed for limited circulation at Calcutta, by order of the Governor-General, is now in the course of publication by the East India Company, accompanied by a map, engraved by Mr. Arrowsmith; and Mr. John Crawford, who, from his acquaintance with the Burmese empire, is most competent to express an opinion, has spoken of it with marked approbation.

China.—Believing that our members would gladly receive information relating to China from so competent an authority, I induced our distinguished member Sir John Davis to read at one of our meetings a Paper of great value, and which many of you heard with pleasure.* Certainly no living Englishman, and indeed no living European, was so competent to such a task. He is among

* See Proceedings, No. IX.

the few of our countrymen who have acquired the difficult language of China, and he long filled the highest offices which an Englishman can discharge in relation to that singular country. The fruits of his literary labours have been several works, which have the rare merit of being at once popular and scientific. As one of the most important of these, his 'China and the Chinese,' is by far the best account of the empire in any language, I am glad to find that a third edition of it has just been published.

AFRICA.

The additions to our acquaintance with the interior of Africa since the last anniversary, when my predecessor delivered the Patron's Gold Medal to Dr. Barth, have been considerable. That meritorious explorer of vast regions has since issued to the public three volumes, which, recording his earlier wanderings, are to be followed by two others, completing a work which will doubtless be considered the worthy termination of so many years of patient research under great privations. The maps which accompany the narrative have been executed by Mr. Petermann, from the careful itineraries of Barth, the astronomical determinations by Vogel of the positions of Murzuk, Kuka, and Zinder having formed the base. Dr. Overweg's determinations of latitude have been made use of as regards the route from Tripoli to Tintellust and the route to Musgu; and I learn from Dr. Barth that all these points will be discussed at the close of the work. I reserve, therefore, my full observations on the whole of the labours of the only British traveller who ever returned from Timbuctoo, until we have before us the concluding description of his arduous journeys. In the mean time, however, it may be truly said, that the volumes already published contain much valuable information, and show that Dr. Barth was so completely at home among the natives, with seven of whose languages he was familiar, and made such very diligent inquiries, that the information thus gathered, is far more ample and minute than that of his precursors; the itineraries, which have been compiled from hearsay evidence, being entitled to especial weight. It is particularly worthy of notice that the tracts which this traveller explored to the south of Lake Chad were found to be level, and abounding with lagoons, swamps, and long flooded tracts, analogous to those which Livingstone found to the south of the Equator, whilst the watershed between the affluents of Lake Chad and the river Benué, would seem to be little more marked, than that between the Zam-

besi and Lake Ngami of S. Africa. So much is this the case, that Barth suggests how boats may reach the lake in ascending from the sea.*

Independently of the impediments which the climate and its diseases offer to the research of Europeans, the other great obstacles presented to the enterprise of Barth and his companions have not, I apprehend, been sufficiently appreciated. All along the broad zone stretching across Central Africa, between 11° and 5° of N. lat., there prevails more or less a continuous and merciless warfare between the Mahomedans and the Pagans, which presents the most appalling checks to the traveller proceeding from the territory of any Mahomedan prince to whom he may be accredited. For whilst Livingstone has demonstrated the practicability of traversing vast tracts of Southern Africa, occupied by people speaking various dialects of the same language (none of them being Mahomedans), such facility of intercourse is forbidden through the region north of the equator. There, a solitary traveller, scantily supplied with means, has to cross this belt by proceeding through hostile tribes engaged in sanguinary warfare, and is at the mercy of every petty tribe and barbarous chief whose district he has to traverse.

Whilst in regard to Overweg, who, it appears, kept very few notes, we have to regret that nearly all the important information he had accumulated perished with him, I am bound to record that Dr. Barth deserves all praise for making and preserving detailed records, when struggling against depressing illnesses and great poverty.

From what we know of the efforts made by himself and his associate, it is, indeed, too manifest that the progress of discovery in Africa, south of Lake Chad, can be only very slow and gradual.

Such, then, are the difficulties from which Barth has escaped, and of which he is now rendering us a vivid and detailed account—such is the country in which Vogel and his faithful attendant, Corporal Maguire, were left. My predecessor has recorded in his last and only Address, what progress Vogel had made after leaving Barth in 1854. Foiled in his attempt to reach Adamawa, the route between Hamarrawa and Yole being occupied by warlike bodies, Dr. Vogel had already determined by astronomical observations the real site of the important town of Yakoba, situated on a rocky plateau 2500 feet above the sea. Returning from Hamarrawa to Gombé, through

mountains inhabited by Pagan tribes, he left Corporal Maguire there, and turned westward himself to determine the watershed between the so-called Yeou, the river which joins the lake Chad from the west, and the smaller and eastern branches of the Kwara or Niger. It was then that he discovered in a very hilly tract a northern or important branch of the Benué, named Gongola, and proceeded as far as Zuriga, the capital of Zeg-Zeg, the erroneous position of which in previous maps he corrected. Proceeding to Bebeji, the site of which he also fixed, he arrived at Kano, a place then afflicted by cholera, and, returning to Yakoba, again descended into the valley of the Benué at Zhibu of Dr. Baikie (Chunbum of Vogel). Visiting several places on the river, he observed a large cetaceous animal called Ayu, to which his attention had been directed by Barth, and since named by Professor Owen *Manatus Vogelii*. Having rejoined Maguire, who had suffered much in the mean time from sickness, they returned in December, 1854, to their head-quarters at Kuka. Procuring there fresh supplies he intended to proceed to the E. and S.E., and started for Waday on the 1st of January of last year, leaving Maguire in Kuka, since which time we have had no reliable tidings of his progress.

Dr. Barth suspects, however, that he must have made some stay at Loga or Logone, visited by both Denham and Barth, and also at Bagirmi, where the latter traveller spent some months, as described in the third volume of his work.

Whether the order ever reached Vogel to direct his steps towards the Nile is unknown, but at all events it is certain that he was proceeding in that direction, when, as it is reported, he fell a sacrifice to the orders of the savage King of Waday, such being the news brought by the natives to Corporal Maguire,* and reported to the Foreign Office by Colonel Hermann, H. M.'s Consul at Tripoli. There is, indeed, too much reason to apprehend that this report may prove true, seeing that the King of Waday, a violent and revengeful man, may have taken the life of Vogel, because some of his sable majesty's property had unfortunately been seized and confiscated in the port of Bene-Ghazi to satisfy the claims of British merchants, and at the very time when an English agent was travelling in Waday.

On the other hand, knowing that both Dr. Barth himself and our other African Medallists, Galton and Livingstone, were reported to

* Corporal Maguire is coming home with the observations and instruments.

be dead, and are now happily among us, I still entertain some hope, that the able and accomplished young Vogel may have escaped with rough treatment and detention only, and that he may return to receive the highest reward which this Society can offer for determining the true position of so many important sites of Central Africa.

Renewed Expedition to the Niger.—From the explorations in Central Africa, which have been progressing from the time of Mungo Park to the present day, let us now turn to the consideration of the expedition which has just been sent out to explore those central parts of Africa, watered by the Niger or Kwara* and its tributaries, and which, recommended to the attention of H. M.'s Government by the Royal Geographical Society and the British Association for the Advancement of Science, is commanded by our associate, Dr. Baikie, who so successfully led the party on the former occasion. Our members will also be glad to hear that this officer is accompanied by the same intelligent surveyor, Mr. May, R.N., who was his companion during the previous voyage up the Chadda or Benué; by Lieut. Glover, R.N., well acquainted with surveying and astronomical observation; by Assistant-Surgeon Davis, R.N., and by collectors of natural history specimens; whilst it is expected that the well-known Church Missionary, the Rev. Samuel Crowther, may also join the expedition on the coast.

The vessel for ascending the rivers is the *Day-Spring*, an iron screw steamer of 170 tons burthen, prepared by Mr. Macgregor Laird, combining 30-horse power with less than 5 feet draught of water, and arranged to carry three months' provisions and coals for 20 days. The main objects of the expedition as contemplated by the Earl of Clarendon, who has specially patronised and sanctioned it, and as organized by the Admiralty, are to explore the river Niger and its tributaries, to ascertain the natural productions and capabilities of the countries through which they flow, to enter into friendly relations with the native chiefs, to facilitate the return of liberated Africans to their homes, and practically to show the advantages of legitimate trade over the debasing and demoralising traffic in slaves.

Ascending the Kwara to Rabbat, and leaving the steamer there, the party will, in the first instance, proceed by land to visit Sakatu,

* Spelt Kwara by Barth and by the Admiralty; Kwora by Baikie, and Quorra by old travellers.

where poor Clapperton died, and there present to the Mahomedan Sultan, to whom they are accredited, a firman from the Porte. After a short stay at Sakatu¹ it is proposed that they should march westerly to Isai on the Kwara, a populous town visited by Barth in 1854, and thence descend the river by Busah in canoes and rejoin the vessel at Rabbat, a tract which may, I apprehend, prove rich in mineral contents. Now, whilst parts of this region have before been traversed by the travellers Park, Clapperton, Lander, and Barth, the first of whom was killed at Busah, the country is still much too imperfectly known to be accurately mapped, though, as we have just seen, Vogel has fixed the site of some adjacent places. Still less are we acquainted with its mineral constitution.

As this expedition, well equipped and well found in provisions, medicines, and presents for the natives, will consist of 12 Europeans and 40 liberated black seamen, opportunities will be afforded of dividing the force and of exploring regions on either bank of the great river. Thus, the Government attaches great importance to the ascertainment of a safe route from Lagos and Abeokuta to Rabbat on the Niger, by which the liberated Africans can return to their homes, and extend their commercial habits to the places of their birth. During the period of the next year, when the river is low and the heat great, the party is to seek high and healthy ground near the confluence of the Benué or Chadda and the Kwara, where it is understood that Mr. Macgregor Laird will establish a commercial station.

When in the interior, however, the leader of the expedition is specially charged to impress upon the natives that the British Government is far from having any desire to establish colonies or settlements which might give umbrage and provoke quarrels, but is solely desirous of promoting such legitimate trade as, in enriching the natives and our own merchants, may effectually check the slave-trade.

A second rainy season will be devoted to the exploration and ascent of the Chadda or Benué, and, as the Day-Spring draws less water than the Pleiad did, it is hoped she may reach a higher point than was attained on the former occasion. It is possible that the fertile region of Adamawa, on the one hand, and Hamarrawa, on the other, may be explored, and even, if opportunity offers, that the higher part of the Old Calabar river in a more westerly meridian may be reached at some point above that to which Oldfield ascended in a steamer in 1836.

Heartily must this Society wish success to such a well-planned

renewal of our intercourse with the more civilised and Mahomedan tracts of Central Africa, which, in addition to the acquirement of important geographical and natural history knowledge, has in view the object so dear to all philanthropists, of encouraging the natives to exchange their natural productions for the manufactures of Europe, and in abandoning their warlike predatory habits to take to the pursuits of agriculture and commerce.

Having taken a deep interest in that former expedition, which, under the command of the same meritorious officer, returned without the loss of a man, I have on this occasion prepared instructions for the geological examination of a region which I apprehend may be found to contain much mineral wealth.

In fact, if the survey be completed in the manner devised, the whole western side of Central Africa will have been so traversed, as to yield two important sections, which cannot fail to give us the knowledge we desire. The Niger, or Kwara, flows in a gorge across such thick ribs of rock as must surely enable the travellers to read off a clear lesson; whilst an excursion from the upper part of the Chadda to the sources of the Calabar on the one hand, and to the heights of Aed Hamarrawa on the other, will also afford an instructive parallel traverse of no less importance.

Rejoicing that Mr. May, the Master, of the Royal Navy, who laid down the soundings and defined the banks of the Chadda, should have returned from Canton, where he has been serving, during the capture of the forts under Admiral Sir Michael Seymour, to rejoin his old companion Dr. Baikie, and confident that they will both of them do all in their power to make geological observations, I must express my regret that there should not have been some one person in this expedition, whose special duty it was to ascertain the true condition of the substrata. For, inasmuch as one great feature of the enterprise is the discovery of sources for future trade, so surely must it be of paramount value to be made acquainted with sites of coal, iron, copper, lead, and gold.

Hoping, however, that the zeal and ability of the explorers may remedy the only deficiency which is observable in the project, I cannot terminate the subject without reminding you of our deep obligations to the Earl of Clarendon for his judicious and liberal support of an exploration which, carried out as it will be by the efficient orders of the Admiralty, must not only advance our favourite science, but will also, I trust, prove a blessing to the natives, and a boon to the commercial world.

The White Nile.—M. Ferdinand de Lesseps has collected, during a recent visit to Khartúm, some information on the present state of the several European settlements along the upper course of the White Nile.

It appears, from his account, that the missionary station of Don Ignacio Knoblecher has attained considerable importance. It is situated about lat. N. $4^{\circ} 35'$, and is above the highest point reached by M. d'Arnaud. A trading establishment has been formed by M. de Malzac among the Djours, at 300 miles west of the river, and between the 6th and 7th parallels of N. latitude, where he collects ivory, and sends it down to the Nile on men's shoulders, the country being too marshy to admit of the employment of beasts of burden.

It will be recollected that, in the Address of our late President, it was mentioned that, according to the opinion of M. Brun Rollet, so long a settler in these parts, the Misselad was entitled to be considered as the main branch of the Upper Nile; but M. de Malzac dissents from this opinion, and regards the Misselad as a tributary, and not as the main river. The question must, therefore, remain an open one, until we shall have received far more accurate hydrographical data about these regions, than we now possess.

Nile Expedition.—I have to notice with regret the failure of an expedition whose object was to explore the still mysterious sources of the White Nile. Organised with method, it was liberally paid for by the Viceroy of Egypt, and placed under the charge of the Count Escayrac de Lauture, a French geographer, previously known to us by his exploration of Soudan. But disunion and want of zeal among many members of his party becoming painfully apparent, that gentleman was unable to proceed beyond Cairo. In the mean time, however, the flotilla was ordered on in advance, and placed under the direction of our countryman Mr. Anthony Twyford, an able and adventurous young seaman, who, overcoming all obstacles, had the singular merit of carrying two steamers, upwards of 50 feet in length, and four sailing-boats, over the first, second, and third cataracts, to beyond Dongola! * Having laid in abundance of cordage at Alexandria, and commanding, through a firman of the Pasha, a vast number of the natives (at one time upwards of 3000 men), Mr. Twyford so skilfully applied his ropes to the projecting

* The flotilla was manned by sixty-six native soldiers and sailors, whilst Dr. Ponchet, a physician, and Mr. Clauge, a photographer, were of the party. The largest of the two steamers was left at Assouan.

rocks, and so energetically urged on the men, that he reached Don-gola in ten weeks from Cairo.

When all the difficulties had been overcome, a messenger reached Mr. Twyford, and, to his great annoyance, ordered him to return, which he did, without loss.

*Livingstone's * Researches.*—Passing now to South Africa, let us see what immense strides have been made since our last Anniversary. Our late President, then speaking of the previous achievements of Livingstone, told us that the undaunted traveller was proceeding to the East to reach the Indian Ocean at Quilimane. But how apprehensive were we that, after all his marvellous escapes, this extraordinary man might still fall a victim to the climate in which so many of our countrymen had succumbed! Great, therefore, was the rejoicing, when those letters arrived † in which he narrated his passage from the interior low country, across the high grounds, and along the gorges of the Zambesi, and the great falls of that river, and announced his safe arrival at the Portuguese settlement of Tete!

Still greater was our joy when he landed on his native shore to receive that hearty welcome which was sure to attend a traveller who, having accomplished such feats, brought us back so much fresh knowledge respecting the interior and flanks of that part of the great continent of which we were previously ignorant.

The outline of the travels of Livingstone is now so generally known to the public, and has been so graphically presented by himself to various assemblies of his countrymen, that any rehearsal of it on my part is wholly uncalled for; the more so, as at the Special Meeting we held on the 15th of December last, in honour of his arrival, I offered those observations which were printed in your Proceedings. Whilst the public is anxiously looking forward to the publication of the details of these journeys, which I have reason to believe will take place in about three months, I will briefly advert to one or two leading features only of them.

The hypothesis I ventured to throw out in what I termed a "Comparative View of Africa in Primeval and Modern Times," when I presided over you in 1852,‡ that the central regions of

* Since his return to England this traveller has changed the spelling of his name, adopting the form used by his father, and adding the *e* to Livingston.

† Addressed to myself.

‡ Journal Royal Geog. Soc., vol. xxii., Prel. Discourse, p. cxxi.

Africa would be found to be a comparatively low, watery expanse, the rivers issuing from which escaped to the east or to the west through gorges or rents in the subtending higher chains, was proved to demonstration by Livingstone, as respects that vast African river, the Zambesi.

The observations of this great traveller afford also the proof that several of the principal rivers of Africa south of the equator have their sources in comparatively level tracts of no great altitude. Just as the great rivers of Russia are separated at their sources by water-partings of such slight altitude, that Peter the Great connected these diverging streams by canals, so Dr. Livingstone has observed analogous phenomena in the heart of Africa. The African case is, indeed, still more remarkable. In this region Nature herself has made the connecting canal; for flat boats and canoes can pass northwards by the Dilolo river into the affluents of the Congo or Zaire on the west, and into the Zambesi on the east.

These humid regions, particularly towards the west side of the continent, are covered by lofty forest trees, abundance of ferns, mosses, and other plants requiring much moisture. Hence the explorations of Livingstone, opening out such new and unexpected data, induce me to put a question for solution by physical geographers. Why does it happen, that whilst moisture so prevails in $\text{lat. } 10^{\circ}$ to 15° south of the equator, the same districts equally distant from that line upon the north (as touched upon by Barth) should be arid and comparatively dry? After such positive data as those collected by Livingstone, we have indeed no longer occasion to stretch the imagination and suppose the existence of great snowy mountains from which the waters of the Nile take their rise; since we now see that the Zambesi and the Congo are supplied from marshes at lower levels than the chains through which those streams escape. The simple fact is, that in Central Africa there are two copious rainy seasons due to the periodical influence of the sun, the passage of which is accompanied by copious torrents. By the first of these rains the boggy lands become to a great degree saturated, but the water not overflowing, finds no exit in the absence of an adequate declivity. It is only when the whole spongy mass becomes supersaturated by the second rains, that the waters rising to a great height, furnish the Zambesi with its annual flood.

In like manner the Nile may owe its annual flood to a similar cause—a point which can only be determined when our bold ex-

plorer, Captain Richard Burton, shall have informed us, whether the large Lake of Uniamesi be not the real feeder of the Nile, or if there really be lofty snow-covered mountains under the equator, as described in the distance by our missionaries.

On this latter point I confess myself to have been to a great degree incredulous; whilst the last observations of Livingstone would lead me to suppose that the Nile, like the Zambesi, is fed from a great interior, boggy, and lacustrine region.

Again, in bringing home specimens of the white dolomitic rocks which constitute the eastern ridge, at a distance of 300 miles from the shore of Africa, and in expressing his opinion that such rocks range far to the N.N.E., or towards Kilimanjaro, the supposed sources of the Nile, Livingstone arrives at the suggestion, that the whiteness of those mountains near the equator, which the missionaries, who saw them at a distance, took for snow, may truly be nothing more than white quartz rocks and crystalline dolomitic limestones, which, glittering under a tropical sun, might well be mistaken.

Let us hope that the journeys now in progress by our clever and adventurous traveller, Captain Burton, from Mombas or Zanzibar, may settle this problem, and also determine the real nature and extent of the supposed great inland sea, on which our learned geographer Cooley has speculated, and of which the missionaries, Krapf, Rebmann, and Erhardt, have given us a rude sketch-map, compiled from hearsay testimony.

On this and many other collateral points it is not my intention to dilate; for he who would arrive at a sound conclusion must study the writings of Cooley and McQueen, and all the Portuguese authorities, and then collate them with the practical conclusions of Dr. Livingstone, who, having travelled over eleven thousand miles of African ground, and having wandered so long among the sources of the Congo and the Zambesi, is certainly the most valuable witness we can call, when such matters are under discussion.

Great as are the deserts of Dr. Livingstone as a discoverer of new lands, or as a missionary and philanthropist, his real title to the high estimation of the Geographical Society is, that by astronomical observations he has determined the longitude as well as latitude of so many sites, hitherto entirely unknown to us, and has constructed detailed maps of those regions. On this head indeed the language which Mr. Maclear, the astronomer at the Cape of Good Hope, has

used is the most appropriate and truest eulogy which can be applied to our Medallist.*

Having observed in the character of my friend Dr. Livingstone a happy union of simplicity, patience, unruffled temper, and kindness, with the quickest perception, and the most undaunted resolution, I feel persuaded that, vast as have been his achievements, he is still destined to confer great advantages upon South Africa and his own country. His aim, when he returns to Quilimane and Tete, in the spring of 1858, or the first period of the healthy season, and after he has rejoined his old companions the Makololo, who are anxiously waiting for him, will be to endeavour to establish marts or stations beyond the Portuguese colony, to which the inhabitants of the interior may bring their goods for sale, and where they may interchange them for British produce. At these stations, which will be in those flanking, high grounds of the African continent that he has described as perfect sanatoria, he will endeavour to extend the growth of cotton, as well as to teach the natives how to till their lands, taking out with him for these intents cotton-seed, gins, ploughs, &c. He will further endeavour to bring to the English market a vegetable called Buàze, which possesses so tough and fibrous a tissue as to render it of great value even to the natives in their rude manufactures. Specimens of this plant, which grows in profusion on the north bank of the Zambesi, have been converted into a substance that has been pronounced by a leading manufacturer to be worth, when prepared, between fifty and sixty pounds per ton, and applicable to all purposes for which flax is employed. In this material, therefore, alone, to say nothing of indigo, cotton,† beeswax, ivory, and the ores of iron, with much good coal, we have sufficient indication that no time should be lost in establishing a regular intercourse with the natives of so prolific a region.

Thus, acting as the pioneer of civilisation, Dr. Livingstone will first engage the good will of the natives through their love of barter, and, having secured their confidence by honesty of purpose, he will the more readily be able to lead them to adopt the truths of that religion of which he is a minister, and of the value of which his whole life is a practical illustration.

Fortunate is it for our country that we have in the Earl of

* See Proceedings, No. vii. p. 268.

† I learn with pleasure that great success has already attended the endeavours of the philanthropists who have introduced the culture of cotton near Abeokuta, in West Africa, and its preparation for export.

Clarendon a Minister of Foreign Affairs, who not less than the noble Premier has been the consistent and vigorous supporter of every measure tending to root out the trade in slaves; and impressed as our Government is with the desire to sow those seeds of civilisation among the natives, and probably realise the cheering prospect of a great production of the raw material necessary for our manufactures by the independent nations of Africa, let us hope that, whilst the Niger or Kwara Expedition under Baikie, to which I have adverted, is working towards that good end upon the West, the benevolent and enterprising Livingstone, already so dear to the natives, may be sent back to reside among his friends the Makololo, as the "Agent of the Queen of the people who love the Black Man."

AUSTRALIA.

Although there are grounds for believing that in the sixteenth century the Portuguese descried lands which, from their position in old MS. maps, must have been Australia, our own great navigator Cook was really the first to discover, examine, and describe large portions of the coast of this vast continent.*

Afterwards remaining for a long time among the "*terræ reclusæ*" of the world, this vast region, the interior of which proves to be a worthless desert,† now offers to the world the glorious spectacle of four great British colonies or separate governments on its eastern, western, and southern shores, whilst it pours forth on the old countries of Europe a shower of mineral wealth far exceeding in amount anything hitherto recorded in the history of mankind.

Thirteen years have elapsed since, as your President, I dwelt at some length upon an Australian topic, which seemed to me of paramount importance—the retention of Port Essington, and the establishment of other settlements in Northern Australia. Having lived to re-occupy this Chair, I will revert to the same theme; whilst I crave your indulgence if I previously engage your thoughts for a few moments on another Australian subject to which I have also given some attention—the gold produce of those countries.‡

* An ingenious paper or two have been written to show that the discoveries of Cook may have been based upon a knowledge of those early documents, but in a forthcoming volume of the Hakluyt Society, our Associate, Mr. Major, will demonstrate that such suggestions are entirely fallacious.

† See Award of the Patron's Medal, p. 367.

‡ For the first printed documents relating to Australian gold, see the following Memoirs, viz.—Journal Royal Geographical Society, 1844, President's Address; Letter from myself to Sir C. Lemon, Transactions Roy. Geol. Soc. Cornwall, 1846; Letter to the Secretary for the Colonies, 1848; Report of the Nineteenth

If New South Wales has exhibited a diminished supply from most of those tracts which first gave forth their golden abundance, and has only recently been enriched by a small additional quantity derived from a part of Bathurst county, the great coast-chain, bending to the west, and passing from the high level of the Mount Kosciusko of Strzelecki to Victoria, has proved to be charged in certain spots with an amount of gold quite unheard of in any other part of the world.*

The extraordinary rise of the flourishing colony of Victoria is the necessary result of such a vast auriferous produce, and the simple fact, that upwards of 125 tons of gold were sent to Britain in the preceding year, exclusive of local use and exportation to other countries, is so astounding, that a few years ago the mind would have been incapable of measuring the effects which such an enormous addition to the symbol of material wealth might produce upon the destinies of the human race.

Without pretending to statistical acquirements, I formerly ventured to contend that, as the scarcity of the precious metals throughout vast portions of the civilized world had long been a growing evil, and that the hoarding of a substance so easily hidden as gold would continue, and even increase, in countries having unsettled governments, so it seemed to me † that, great as the supply might be, it would not be more than sufficient to meet the demand. The dry river-beds of the old world had, in fact, to be filled up with the golden stream; and experience has now shown us how long it has taken to fill them, and how inadequately they are yet supplied.

But then comes this question. If the present annual amount of supply from Victoria and California should continue, must not a great depreciation of the precious metal follow? Now the answer must be shaped in accordance with unquestionable geological and statistical evidence. Judging from experience, all gold-veins in the solid crust of the earth diminish and deteriorate downwards,

Meeting Brit. Assoc. Adv. of Science, 1849, &c., Trans. of Sections, p. 60; Quarterly Review, vol. lxxxvii. (1850), p. 429.

* The total produce of New South Wales in 1856 was 138,823 ozs., whilst the returns from Melbourne for the same year give the enormous amount of 125 tons 6 cwt. 6 lbs., or a money value of upwards of 12 millions. My distinguished friend Sir Charles Nicholson, formerly Speaker of the House of Representatives at Sydney, informs me that there can be no doubt that gold is surreptitiously disposed of to a considerable extent (by the Chinese especially); so that the actual quantity of the precious metal produced is probably in great excess of that specified in the official tables.

† Quarterly Review, *supra*.

and can rarely be followed to any great depth except at a loss in working them. Again, as the richest portions of gold ore have been aggregated near the upper part of the original veinstones, so the heaps of gravel or detritus resulting either from former powerful abrasion or from the diurnal wear and tear of ages, and derived from the *surface* of such gold-bearing rocks, are, with rare exceptions, the only materials from which gold has been or can be extracted to great profit. These postulates, on which I have long insisted, in spite of the opposition of theorists and schemers, have every year received further confirmation, and seem, on the whole, to be so well sustained as matters of fact, that the real problem we have now to solve is, How much time will elapse before the gold of Australia is finally riddled out of these heaps or basins, or extracted from a few *superficial* veinstones?

It would indeed be presumptuous in any one who had not closely surveyed the rich auriferous tract of Victoria to pretend to answer this question; but I beg my associates to understand, that there is a wide distinction between the measurable capacity of the contents of these broken heaps, or rare thin veinstones *in situ*, and those imaginary mountains with bowels of gold of the theorist, the very thought of which has shaken the nerves of so many fundholders. For, it must be remembered, that all the accumulations of broken golden materials, or the great sources of supply, have well-defined bottoms. They are, in fact, troughs filled in with gravel or shingle, the cubical contents of which, when the country has been thoroughly surveyed, can be computed; and though it may never be possible to predicate the amount of ore contained in all parts of such slopes or hollows, yet, judging from the rate of excavation now going on, a good geologist like Mr. Selwyn, who is conducting the survey in Victoria, may well be able to give us approximate data as to the probable number of years required to empty out the metalliferous fragments from all those troughs or basins in which they have been detected.*

The other sources to which I have alluded, I learn from Mr. Westgarth, an intelligent resident of the colony, have however of late been worked to some profit. These are the narrow veinstones of quartz rock, two or three feet thick, which at the surface are rich in

* A certain amount of the gold of Melbourne, whether occurring in drift or finely levigated clay, is reached by sinking shafts through basaltic coulées, which have evidently flowed in recent times, since they cover woody substances, including cones which, though in a charred or brown-coal condition, have been recognized by Mr. Robert Brown, as belonging to the remarkable Australian living genus, the *Banksia*, which that great botanist was the first to find and describe.

gold, and which have also been partially worked in California; and so long as the miner is near the surface, these veinstones will unquestionably well repay the cost of working them. When, however, they are followed downwards into the body of the rock, they have usually been found impoverished, either thinning out into slender filaments, or graduating into silver or other ores; so that these insulated thin courses of auriferous quartz—mere threads in the mountain masses—will soon be exhausted for all profitable purposes, when the upper portions shall have been quarried out.

But whatever may be the duration of the gold produce, Victoria has already become a wealthy colony, whose agriculture and commerce have risen to a pitch which will ensure her future greatness, even should the period arrive when her rich golden harvests are no longer to be gathered.

Nowhere in the annals of mankind has there been known so wonderfully rapid a rise, as that which has taken place in and around a spot which, surveyed only a few years ago, was first formed into a separate colony in 1837. In each file of the well-written periodicals of Melbourne, we see pregnant proofs that this spot is already one of the great centres of the world's commerce, and is inhabited by an intelligent and advancing people, well worthy of the parent stock.

The latest accounts from Western Australia, given in the detailed explorations of it, as published in our Proceedings, afford little hope that our colonists are there to be enriched by mineral wealth; the great saline desert which Sturt tracked from south to north, and Eyre travelled upon coast-wise on the south-west, having been met with at several points by Gregory and Austin. Again, rich as is South Australia in her Burra-Burra copper-mines, no material quantity of gold has yet been detected in that colony, notwithstanding some vigorous searches, among which those of Mr. Herschel Babbage have recently been brought to your notice.

Turning, then, from that knot of elevations which, forming the background of Victoria, are so prolific in gold, and exploring that long Eastern Cordillera which leads from New South Wales to the Gulf of Carpentaria, though we may meet at intervals with an auriferous patch or two to entice the explorer northwards, the real incitement to new settlers is found in the rich soil and the good herbage they fall in with, as they extend civilization northwards. Thus, from the clear and accurate survey of the vast Peel River settlements by that sound mining geologist, M. Odernheimer, we now

know that no valuable amount of gold is to be found there, either in the loose *débris* or in the solid rocks. Independently, however, of gold, the northern progress of civilization, as far as skill and energy can aid it, will assuredly be secured upon a solid basis by the present enlightened Governor-General Sir W. Denison.

The exploration of that eastern Cordillera, so long ago undertaken by our enterprising associate Count Strzelecki, to which I specially directed your attention in 1844, and which has since been carried further out by Leichhardt, Kennedy, and Mitchell, has recently had its northern and north-western offsets brought more definitely into notice by Gregory and his associates.* The advanced guard of the colonists has now even crept on so far beyond Moreton Bay, as to be already within about 560 miles of the head of the Gulf of Carpentaria; and judging from the fertile nature of most of the unoccupied lands, the period is doubtless not very distant when our countrymen will reach that great haven, which, penetrating for 500 miles into the continent, will surely, in future ages, be crowded with ships carrying on a great commercial intercourse between Australia and the Eastern Archipelago, Hindostan, and China.

Looking to that future, and even to our present interests, it was a subject of regret to many of us, that it should have been thought expedient to discontinue the occupation of Port Essington, and to abandon all intention of holding any other station along the northern coast of this vast continent. Unable now to enter upon a consideration of what bay of the eastern side of the Gulf of Carpentaria may be selected as an "entrepôt," I have little doubt that the time will soon come, when all minor difficulties will disappear before the energy of British colonists, in their endeavours to connect their Australian possessions with the rich marts of the Eastern hemisphere.

In treating this subject there is, however, another point which seems to me of such incalculable national importance, that I must beg your permission to say a few words upon it. If the idea of forming settlements through convict labour is to be discarded as respects the Gulf of Carpentaria, because the free population of New South Wales is advancing towards that great haven, then let us turn to that noble bay upon the north coast, of which Cambridge Gulf forms the western side, and whose eastern side receives the waters of the Victoria River. First explored by Philip King in

* Award of the Gold Medals, *ante*. No auriferous tract appears to have been discovered by Mr. Gregory's party.

1819,* and by Wickham and Stokes in 1839, the basin of the Victoria was recently the scene of the encampment of Gregory, whence he extended his researches southwards to the saline desert, and eastwards to the Gulf of Carpentaria. The real opinion of such an experienced colonist and geographer (whose merits have been already dwelt upon in conferring upon him our Founder's Gold Medal) is of infinitely greater value than those speculations which would describe the whole of that region, on account of its latitude, as unfit for the settlement of the Anglo-Saxon race! The plain answer to this view is, that on the banks of the navigable river Victoria, the party of Wickham and Stokes were perfectly healthy in 1839; and that recently our countrymen were stationed there for nine months without the loss of a man. Our medallist Mr. Gregory, after a residence of many years in Western Australia, has thus written to his friend, the former Governor of that province:† "This portion of Australia far surpasses the western coast both in its fertility and extent, and its capabilities for settlement. Good harbours are numerous along the coast, and there is abundance of fine country for stock and cultivation." Again, he says: "The valley of the Victoria far exceeds the best parts of Western Australia both in fertility and extent."

Let us also hear what Dr. Ferdinand Mueller, the botanist of the last expedition, says. This gentleman, who, by his Australian researches, has, according to Sir W. Hooker, placed himself in the front rank of botanists, having collected in tropical Australia about 1500 species of plants, of which 500 are new, thus writes to his friend Mr. C. Latrobe, the former Lieut.-Governor of Victoria:—"North Australia, with the exception of the east coast, possesses essentially a *dry Australian*, and not a *moist Indian climate*. *Fevers do not therefore exist*, and we escaped such jungles and swamps as those in which Kennedy's party exhausted their strength. There

* As these pages are passing through the press, my valued friend Dr. Fitton called my attention to his Appendix to the Voyages of that admirable surveyor the élève of Flinders, Capt. Philip P. King, along "Intertropical and Western Australia" (1826). I have communicated the letter of this eminent geologist to the Society, and the readers of our Journal will see in it an able effort to derive generalizations from the examination of specimens collected by King and the trend of the rock masses.

These descriptions of King and Fitton should be compared with those of Grey and Lushington, who in 1837 examined that portion of the north coast between Prince Regent River and the Glenelg, and also with the more recent observations of Mr. J. Beete Jukes, as given in his work entitled 'Sketch of the Physical Structure of Australia' (1847).

† Captain Fitz Gerald, R.N.

is abundance of good country in North Australia, and, with access for vessels to the lower part of the Victoria, full scope for the formation of a new colony. But as a new settlement can scarcely be formed in such a remote and certainly hot part of the globe without prison labour, against which the public mind is turned with such decision, and as, without great inducements, the squatters will find it for a long time unprofitable to migrate in this direction, I fear that the pastures of North Australia will yet be left flockless for a long time." *

With such facts before them, it is possible that our Government may see that this prolific and healthy region, *so remote and so entirely cut off by the great interior saline desert from all our established colonies, that no intercommunication can possibly take place*, † is, notwithstanding its summer heats, a perfectly fit and proper receptacle for our convicts, whose labour there would completely repay their cost of maintenance. When our prisons are crowded, and crime is rapidly augmenting with our increasing population, it does indeed seem desirable to seize upon such a zone of exile as is here offered, and, by removing worthless characters from our land, render them really useful in occupying the only coast of that continent on which the British flag does not now fly, though it has been there twice unfurled. But I forbear to press this feature of a topic which can be better handled by politicians; and all I venture to urge is, that, whether by forced ‡ or free labour, North Australia should be colonised.

When presiding over you in 1844, and in then expressing an opinion from the best authority § that, if our Government would

* Mr. Elsey, the surgeon of the expedition, who has reached London whilst this Address is passing through the press, completely confirms this view of the productiveness and healthiness of the region.

† See Grounds of the Award of the Patron's Gold Medal to Mr. Gregory, and a description of these tracts.

‡ It has indeed been stated, that the inhabitants of the free colonies of Australia protest against any further transportation to that continent. Now, a resident of Victoria in S. Australia might with as much consistency declare, that there should be no penal settlement in any part of the world, as that the *Victoria of North Australia* should not be so first settled through convict labour; for the great interior saline desert more completely separates the northern from the southern region of Australia than any sea. That desert is utterly impassable by human efforts, and any convict who should escape from Victoria River or Cambridge Gulf would have to find his way by upwards of 4000 miles of sea voyage before he could reach Melbourne! It is indeed extraordinary that in the debates upon this subject, no allusion has been yet made to Cambridge Gulf and the rich basin of the Victoria river. See Debates H. of Commons, May 15, 1857, when Mr. Baxter quoted the Melbourne Correspondent of 'The Times.'

§ Journal Roy. Geogr. Soc., vol. xiv., President's Address, p. xevii.

render Port Essington a permanent and independent colony, rich mercantile houses would at once set up establishments there, and freight large vessels to trade with the Eastern Archipelago and China, I wrote in the full conviction that, even if that particular station should be abandoned because it was exposed to tornados, other sites could be selected in a region, which so many experienced naval officers and other authorities have eulogised as offering capacious harbours and a climate not unsuited to Europeans—lands in which the pastures are magnificent, whilst the sea swarms with the finest fishes.

In the face, then, of these evidences, is the state of indifference of our country to North Australia to continue? Is Britain not to commence the formation of a settlement, whether by penal servitude or free labour, in the fertile basin of the northern Victoria or elsewhere, and thus secure future entrepôts for her commerce? What better guarantees can be had that success would follow, than the fact, that in the worst and most exposed part of this region (Port Essington) a British garrison was in a healthy state for several years, and that in its more southern portion the explorers in two expeditions have equally preserved good health?

Lastly, looking to the future destinies of our country, is it to be forgotten, that France has recently taken possession, not only of that New Caledonia which our own Cook discovered and named, but also of the Isle of Pines, where our colonists from Sydney carried on a trade in sandal-wood, and has thus acquired a "point d'appui" on the eastern flank of our largest Australian colony?

Or, ought we to close our eyes to the vast importance not only of securing good harbours of refuge in Northern Australia, but also of there establishing naval stations, which would prove invaluable for steam navigation, and where, in the event of war, our fleets may rendezvous, and thence move directly upon the flank of any enemy, who might be operating against our Eastern trade and possessions?

In short, it is scarcely possible to point to any region of the globe where British occupation is so imperatively called for, whether as a precaution, or with a view to future commercial interests. Expressing, then, an earnest hope that a settlement may be soon established on the banks of the Victoria, and in the adjacent Cambridge Gulf, and believing that great national advantages must follow, let us trust that, if such a consummation be attained, the proposers of it may not be forgotten, and that it will be remembered that the last

North Australian expedition, now happily completed under the direction of Her Majesty's Government, was a child of the Royal Geographical Society.

NORTH AMERICA.

British Possessions.—The gradual advance of civilized man towards the remoter regions of North-western America, has long drawn the attention of geographers to those extensive tracts, still distant from the settled country, which afford an almost undisturbed asylum to the aboriginal population of the continent. It would scarcely be credited, that within the limits of British America, a region including at least 112,000 square miles, extending from the head waters of the Assiniboine River to the foot of the Rocky Mountains, and from the northern branch of the Saskatchewan to the 49th parallel of latitude, our boundary with the United States, has remained almost completely unexplored.

The comparative scarcity of fur-bearing animals in this portion of the territory of the Hudson Bay Company, the warlike character of the Indians, and other causes, have alike contributed to prolong our ignorance of lands which may, at no distant time, become the home of thousands of our countrymen.

Mr. Palliser, a traveller, who had already spent a considerable time in the neighbouring districts of the Upper Missouri, and whose adventures as a sportsman form the subject of a popular work, conceived the project of employing two years in the exploration of the tract to which I have referred, along with the adjoining portion of the Rocky Mountains.

Mr. Palliser's original intention was, as I have understood, to undertake this journey at his own expense and with no other companions than those whom he might engage as voyageurs and hunters to join him in traversing the Indian territory. Having, however, addressed himself to our Secretary, his proposal was at once brought before the notice of the Council, by the direction of which it was referred to our Expedition Committee and fully discussed. In consequence of this a letter was directed by myself on the 6th of January to the Right Hon. Henry Labouchere, the Secretary of the Colonies, in which the Council strongly advocated the exploration of that portion of British North America between the parallels of 49° and 53° N. latitude and 100° to 115° W. longitude. The chief objects of the exploration were then stated to be—

1st. To survey the water-parting between the basins of the

Missouri and Saskatchewan; also the course of the south branch of the Saskatchewan and its tributaries.

2nd. To explore the Rocky Mountains, for the purpose of ascertaining the most southerly pass across to the Pacific, *within the British territory*.

3rd. To report on the natural features and general capabilities of the country, and to construct a map of the routes.

Mr. Palliser's experience, his success in conciliating the good will and respect of the Indians, and his anxiety to make his journey conducive to the increase of scientific knowledge, pointed him out as well fitted to be the leader; but it was evident that without the aid of fellow travellers trained to accurate research and accustomed to the use of scientific instruments, no very accurate results could be expected from the expedition.

After considerable discussion, the Lords of the Treasury consented, on the recommendation of the Secretary for the Colonies, to submit to Parliament a vote of 5000*l.* for this purpose, on the understanding that all the collections and results of the expedition should be placed at the disposal of Government.

Three scientific gentlemen have been since appointed to the expedition—Lieutenant Blakiston, of the Royal Artillery, on the recommendation of the President of the Royal Society, to conduct the astronomical and physical observations; Mr. Bourgeau, an experienced and successful botanical collector, selected by Sir William Hooker, the Director of the Royal Garden at Kew; and Dr. Hector, a medical gentleman recommended by myself on the score of his geological and zoological acquirements, as well as for his general fitness to contribute to the objects of the expedition.* Mr. Palliser is, moreover, himself conversant with the use of the instruments which have been supplied by Government, and has the advantage of an experienced assistant as his Secretary; so that the important object of determining the geographical position of the points visited by the expedition has been amply secured.

The instructions given to Mr. Palliser by H.M. Secretary of State direct, that the journals of the expedition, together with the records of the observations, shall be made out in duplicate, and that one copy shall be transmitted to England, from time to time, as oppor-

* General Sabine has instructed Lieutenant Blakiston in making magnetical observations, a Committee of the Royal Society furnished the necessary instructions in physical science, and the geological suggestions were supplied by myself.—R. I. M.

tunities may occur. An assurance was also given that the journal of the expedition shall be regularly communicated to this Society, according as it shall be received at the Colonial Office.

The departure of the expedition was somewhat delayed by the severe illness of Mr. Palliser, but he sailed with his companions on the 9th of May, and information has been received of their arrival at New York in good health and with their instruments in working order.

During the present season it is intended that they should proceed from Fort William on Lake Superior to Lake Winnipeg and Fort Garry, examining *en route* some portion of the watershed between Lake Superior and Rainy Lake. From Fort Garry the expedition will proceed westward to the head waters of the Assiniboine River, and will explore some portion of the country between the southern branch of the Saskatchewan and the boundary of the United States, turning to the northward to winter at Carlton House Fort.

The summer of 1858 is to be employed in traversing the country of the Blackfeet and Blood Indians, between the two branches of the Saskatchewan, tracing the southern branch to the foot of the Rocky Mountains, and in endeavouring to settle the disputed question as to the existence of a practicable pass in the chain, between the Kootaine Pass south of the 49th parallel, and the Pass between Mount Brown and Mount Hooker, more frequently used by the servants of the Hudson Bay Company.

Apart from the public interest which belongs to the exploration of a large and important portion of British territory, it is impossible not to anticipate valuable additions to natural science from the united labours of the members of this expedition, and to feel proportional satisfaction, that Government should have seen the propriety of complying with our recommendation by fitting it out in an efficient manner.

Let me add, that the establishment of a direct line of intercourse between our Canadian possessions and Vancouver Island, which being 250 miles in length, contains good ports and valuable coal-seams, is not the least important of the national interests connected with this survey.

United States.—The omission at our last anniversary of the progress made in the Coast Surveys of the United States, was owing to the circumstance that the Reports of it had not been received. Since that date, however, the Society has received from Professor A. D. Bache, the Superintendent of the Coast Survey, the Report

for 1854 of the progress of the department under his very able guidance. This great work has been so often mentioned with praise in former Addresses from this chair, that it is unnecessary for me to do more than direct the attention of all geographers to the continued activity and effective practical efforts of Professor Bache and his assistants.

The report on the United States Coast Survey for 1855, has, I regret to say, not yet been received. I hope, however, at our next Anniversary, to be enabled to do full justice to the advances in this department, and the other branches of geographical science which are in progress in the United States.

The eighth volume of the excellent 'Contributions to Knowledge' published by the Smithsonian Society has been received, and comprises most valuable papers by Mr. S. F. Haven, Professor Olmstead, Major Alvord, Dr. Jones, and Mr. Torce, to which I beg particularly to refer.

The American Geographical and Statistical Society—established at New York in 1854, under the presidency of the celebrated historian Bancroft—has now become a numerous and important body. I refer with gratification to one of the pamphlets which this Society has recently published, entitled 'A Report on Recent Discoveries in Sub-Oceanic Geography.' Referring to the data gathered by our Associate, Lieutenant Maury, in the Hydrographical Department at Washington, this Report as put forth by Mr. W. H. C. Waddell, U.S.N., points to the observations of Commander Rodgers, on the temperature and specific gravity of the waters of the Arctic Ocean at various depths; showing that near the surface the water is warm and light, at mid-depths cold, and at the bottom warm and heavy. This discovery, it is inferred, furnishes the only link that seems to have been wanting to complete by facts, the theory of open water in a really polar sea, as originally suggested by General Sabine, and as since supported by De Haven, Kane, and other Arctic voyagers.

Then, again, the deep-sea soundings of Lieutenant Brookes demonstrate that the most profound repose prevails at vast depths, the bottom being found to be of a down-like softness, and composed in most parts of the skeletons and casts of microscopic shells and infusoria.*

* The details of the zoological results afforded by these operations between America and England, as conducted by Lieutenant Berryman, are reserved for future publication.

These observations, so important to the physical geographer, mariner, and naturalist, when combined with the experiments of Professor Morse, led the way to the formation of a company to construct that wonderful telegraphic cable of which I have elsewhere spoken, whilst the wind and current charts as registered in the United States have enabled speculators to select the best line for paying out the electric cord, which, scarcely thicker than a finger, is to connect the New World with the Old.

I must further refer you to the Report of the American Geographical Society for most curious information, as derived from the microscopic examination by Professor Bailey of West Point, of certain unabraded particles brought up from vast depths, which being ashes of volcanic origin, afford fine scope for the speculations of the geographer and geologist respecting the currents by which such materials may have been carried to their present tranquil abode.

One of the most striking works which the American Government has published in the last year is Commodore Perry's 'Narrative of the Voyage of the Squadron under his orders to China and Japan.' This work is replete with valuable geographical and ethnographical notices of the tracts visited, and is illustrated by many explanatory maps and lithographs. It was transmitted to us by that eminent scholar of the United States my friend Mr. Edward Everett, so justly valued by every man of science and letters in our country.

The question of the priority of discovery of the Bonin Islands, so amicably discussed between Commodore Perry and my predecessors the Earl of Ellesmere and Admiral Beechey, has, I trust, at length been settled by the memoir on those islands published in the last volume of our Transactions.

Geographical progress in the United States has been farther marked by the production of two maps of North America by the distinguished geologist Professor Henry Rogers, as brought out by Mr. Keith Johnston, of Edinburgh. One of these is purely a geographical map, on which the strait boundary lines of the different States, as marked by strong colours, necessarily interfere with the natural features of the country. The other, on the contrary, being a geological map, is a representation of ancient nature, in which the author's peculiar talents shine forth; and the masses of land, independent of the shackles which the interests of man have imposed upon them, stand out in all their simplicity.

Our library has also been enriched since the last Meeting with

a work by Captain Randolph B. Marcy, of the U.S. 5th infantry, on his exploration of the Red River of Louisiana, in which he was assisted by Captain George B. McClellan, of the U.S. Engineers. The book is accompanied by reports on the natural history of the territories visited by the expedition, and also by two valuable maps of the country between the frontiers of Arkansas and New Mexico, and of the tract embraced within the basin of the Upper Red River.

Mr. J. G. Kohl, the industrious labourer in the field of statistical research, whose works on Russia and other countries have obtained for him due consideration, has now entered upon the illustration of the geography of America, and, as a prelude to labours which he hopes will be found useful, has just published a little treatise under the title of a 'Descriptive Catalogue of those Maps, Charts, and Surveys relating to America, which are mentioned in Hakluyt's Great Work.'

Though the last session of Congress was the short one, or from December to March only, the subject of geography was not neglected. Adequate grants of money were made for the publication of the surveys of the Expedition to the North Pacific Ocean and Behring Strait, and for finishing the publication of the Charts made by the late Expedition for the Exploration and Survey of the River la Plata and tributaries, as well as for an Exploration of the Paraná and the tributaries of the Paraguay River.

I am also informed that towards the verification of the Survey of the Atrato and Truando Rivers in New Granada, as proposed by Mr. Kelley (see last Anniversary Address, p. cccxii), for the purpose of making a ship canal between the Atlantic and Pacific Oceans, Congress has liberally granted 25,000 dollars. It has also, I am happy to say, been intimated, that the Governments of Great Britain and France are not unwilling to assist in this very important preliminary Survey.

CENTRAL AMERICA.

The communication by canal between the Pacific and Atlantic, to which my predecessor called attention, has a much better chance of being investigated, now that all the states of Europe are at peace, and that the most friendly relations possible exist between the Governments of the United States and Britain.

The Proceedings record how favourably the project of Mr. Kelley of New York was entertained by this Society, and show how deep an interest we take in realizing the early anticipations and wishes

of the illustrious Humboldt. I can only say that no exertion on my part as the President of this Society shall be wanting, to support any proposal which may be made to bring about such a simultaneous and conjoint Geographical Survey made by the Governments of Britain, France, and the United States, as shall definitively settle the points at issue, and demonstrate whether or not it be practicable to execute a great inter-oceanic canal.

SOUTH AMERICA.

New Granada.—Captain Battersby, who has been lately travelling in New Granada, strongly advocates the superior commercial advantages of the River Atrato over the Magdalena as a channel of communication, not only with the people on the upper waters of that stream, but with those of the extensive districts bordering the Cuenca, and of the cities of Antioquia and of Cartajo, the population of which alone he estimates at 30,000; expressing his belief that ere long the traffic on the Atrato must be carried on by steamers, and that then the Gulf of Darien will become the centre of nearly all the commerce of New Granada.

It appears that, in the course of the last year, two steamers, drawing 7 feet water, did ascend the river as high as Quibdo, the capital of Choco. British goods destined for that place are now sent round Cape Horn to the Bay of Buenaventura, and have to be carried thence on mules across the Andes.

Chile.—M. Plessis has completed his map of the province of Santiago de Chile, coloured geologically, a copy of which has been received by the Society, through the kindness of Mr. Bartholomew, who has engraved it.

Those who wish for the latest data on the geographical and other statistics of that section of South America will find them in the *Anuario Chileno*, a yearly publication which contains much useful local information, and in the *Anales de la Universidad*, another periodical, principally edited by M. Domeyko, a well-known geologist and good observer.

Peru and Bolivia.—Mr. Bollaert, our associate, has drawn attention to the existence of a statistical account of *Peru*, published in Lima by Don J. M. Cordova y Urrutia; as well as to a similar work on *Bolivia* by Don José Maria Dalence of Chuquisaca; both of which, if translated, he thinks might be useful to parties interested in those countries.

Río de la Plata.—Lieut. Page's preliminary Report has been pub-

lished '*On the Exploration and Survey of the Rio de la Plata and its Tributaries*,' noticed in Admiral Beechey's Address last year.

The United States' steamer *Waterwitch* was employed on the service in question for more than three years, during which the Paraná and Uruguay, the principal affluents of the Plata, were explored, and the river Paraguay ascended as high as the Brazilian fort of Coramba, in lat. 19° S. From that point the further progress of the vessel was not permitted by the ruling powers, much to the disappointment of Lieut. Page, who hoped to have led the way in opening a communication by steam for the first time with the rich provinces of Matto Grosso and Cuyaba, on the higher waters of this magnificent river.

There must, doubtless, be a great mass of new information to be collected respecting those countries which, under the Colonial rule of their old masters, were closed to all the rest of the world; and we cannot, therefore, but join in anticipating a rich harvest of interesting matter respecting them whenever the further details of the expedition shall be published in extenso, as no doubt they will be ere long, conformably to the liberal and enlightened practice of the Government of the United States.

It is, however, but due to others, when treating of this subject, to mention that the rivers Paraná and Uruguay have been already very carefully surveyed by our own officers, and that Captain Sullivan's admirable charts of them, upon a large scale, were long ago published by the Admiralty under the superintendence of that eminent hydrographer Sir Francis Beaufort.

Those rivers, as well as the Paraguay throughout its course, had been also previously mapped (and, it may be inferred, with some accuracy) by commissioners eminently qualified for the purpose, who had been chosen by the Courts of Spain and Portugal to settle and define their respective rights and limits, in virtue of the treaties of 1750 and 1777, and whose labours on the last occasion extended over a period of no less than twenty years.

The portion of them best known, perhaps, is that connected with Paraguay, in which every place of any importance was fixed by astronomical observation, as may be seen in the well-known work of Azara, who was one of the Spanish commissioners.

Copies of many of the maps of that part of this grand survey were purchased some time ago by the British Museum, and may be referred to in the MS. Department.

The most important result of Lieut. Page's expedition as yet

made known, is the exploration of the River Salado, a tributary of the Paraná, with the evidence adduced of its being navigable in the greater part of its course through the upper provinces of the Argentine Confederation. This has been since verified to a considerable extent by the passage down the river of a boat from Matará,* in the province of Cordova, to Santa Fé, on the Paraná, under the personal guidance of Don Antonio Taboada, a brother of the Governor.

M. Amedée Jaques, a French gentleman, who joined Lieut. Page in his journey into the interior, to explore the course of this river, has published in the 'Revue de Paris' (last March) a highly graphic account of the personal adventures of the party, and of a bloody conflict they had with the wild Indians in the Chaco.

Coast of Patagonia.—Mr. Bragg, an English engineer employed at Buenos Ayres, has discovered and surveyed a good port and roadstead near the old settlement of the Jesuits, in the vicinity of Cape Corrientes, to the south of Buenos Ayres, which had hitherto escaped notice, but which is likely to be of some importance as a place of export for the produce of the adjoining districts. The details respecting it have been forwarded to the Hydrographer of the Admiralty.

Orinoco.—At the commencement of the present year, a proposition was laid before the Society by Admiral Sir Charles Elliot, late Governor of Trinidad, for the resumption of Humboldt's scientific investigations on the Orinoco and its affluents.

The prospective estimate formed by the illustrious philosopher of the advantages to be anticipated from the junction of the Tuamini, a branch of the Orinoco, with the Rio Negro, which falls into the Amazon, together with his more earnest advocacy of the importance of the navigation of the Meta, unquestionably place this suggestion in a very favourable light. The region drained by the vast water-system of the Orinoco is described by Humboldt as "enrichi des productions les plus variées;" and though we may no longer look for the fabled El Dorado of the adventurous Raleigh, the hope may yet be indulged that, by exploratory enterprise and the judicious application of steam navigation, a real El Dorado may yet be founded in this fertile portion of the western world. Nor can I here refrain from an allusion to the valuable edition by our dis-

* Sir Woodbine Parish, in the first edition of his work on those countries eighteen years ago, mentioned that the Salado was known to be navigable as high as that place (Matará), and that if it were used, there would be an enormous saving of land carriage in the conveyance of goods from Buenos Ayres to Santiago in the interior.

tinguished medallist Sir Robert Schomburgk, formerly her Majesty's Commissioner to survey the boundaries of British Guiana, of the "Discovery of the Empire of Guyana by Sir Walter Raleigh," printed for the Hakluyt Society in 1848. Having himself explored what he describes as "the wondrous delta of the Orinoco," Sir Robert was able to enter, with the fullest intelligence and zeal, into the reproduction of those elegant descriptions by Raleigh which he had read with so much delight. These early narratives not only charm us by the quaint and nervous language in which the manly exploits of our ancestors are related, but frequently record discoveries or assert important truths which, from those distant times, lie dormant or are regarded as fictions, until accident or science unfolds anew, to the adventurer of the present day, the secret of their existence. I may mention, by way of illustration, an instance of the manner in which a fact of the greatest moment to the interests of the world may thus lie buried for more than two centuries and a half after its distinct announcement by one of our most distinguished early travellers. In the "World encompassed by Sir Francis Drake," edited for the Hakluyt Society by our associate Mr. Vaux, we find it said of California, which then received from Drake the name of Nova Albion, "There is no part of earth here to be taken up wherein there is not some special likelihood of gold or silver." This voyage of Drake's was made in 1578, and it was not till 1848 that the whole world was astounded by the discovery of the Californian goldfields.

Observatory of Santiago.—"The astronomical geography of positions (Baron Humboldt writes to me) has made progress through the useful establishment of the observatory of Santiago de Chile, founded during the residence of the able astronomer Lieut. Gilliss, of Washington. The Director of the Observatory of Santiago, M. Moesta, has found the difference of longitude between Santiago and Greenwich 4h. 42' 32".4 in time, probable error 3".2.

"M. Moesta thinks, that all the west coast of South America is 17" too much to the west on the best maps. I had found that Callao de Lima was 5h. 18' 16" west of Paris by the passage of Mercury over the solar disc; now Admiral FitzRoy finds the difference of longitude between Valparaiso and Paris 4h. 50' 6".6; and that between Callao and Valparaiso by means of chronometers 0h. 22' 8".4; so that Callao would be 5h. 18' 15" west of Paris, which coincides to within one second of time with the result of the observation of the passage of Mercury observed by me—an accuracy probably accidental. Admiral Beechey has repeated the calculations of Herz and

FitzRoy, showing that the difference of longitude in time between Valparaiso and Paris is $10''\cdot4$ in excess. Callao, therefore, would be only 5h. 18' $4''\cdot6$ to the west of Paris. The passage of Mercury, however, over the solar disc, which was observed on the 4th of May, 1832, at Lima by Mr. Scholz, again gives for Callao 5h. 18' $13''\cdot7$ west of Paris—supposing the chronometrical differences between Lima and Callao, which I published in the second volume of my *Astronomical Observations*, to be correct. The electric telegraph, established in May, 1855, has given 0h. 3' $56''\cdot5$ for the difference of longitude between Valparaiso and Santiago. M. Moesta, therefore, places Valparaiso in 4h. 55' $49''\cdot5$; and I and FitzRoy 4h. 56' $6''\cdot6$."

After this clear and succinct analysis of so valuable a geographical datum, obtained through an expedition of the United States, the veteran philosopher concludes in these words: "And thus this long endurance of life (*cette patience de vivre*) has enabled me to witness all these rectifications." *

In looking to the general configuration of South America, I am further reminded by Baron Humboldt, that the trachytic regions form insulated bands in the Cordillera, such as the volcanic Sangai, to the S.E. of Quito, which is constantly throwing out incandescent scoræ, like those of Stromboli. This insulated trachytic mass, which has a diameter of 45 English miles only, rises out of a granitic and gneissose plateau 16,070 French feet above the sea, thus presenting an analogy to the structure of the Thian Chan in Central Asia.

* Having been made acquainted by my friend Mr. Pentland with data respecting Admiral Beechey of which I was ignorant, it is due to the memory of my lamented predecessor to state, that in a letter to Admiral Krusenstern, he fixed the longitude of Valparaiso by independent astronomical observations at 4h. 46' $37''\cdot6$ ", only differing $8''\cdot6$ from that deduced by Moesta's observations; and as the latter are probably $3''\cdot7$ in error, it follows that there may be little more than one mile between his result and that of Admiral Beechey."

The position adopted on the Admiralty Charts, and in Lient. Raper's elaborate *Tables of Positions*, has been deduced solely by means of chronometers during Admiral FitzRoy's surveys; the latter officer having made few absolute astronomical observations; whilst his chronometrical data are entitled to the greatest degree of confidence.

I am also informed by Mr. Pentland, that he having made independent observations, similar to those of Admiral Beechey (moon culminating stars) at stations referred trigonometrically and chronometrically to places on the coast, he found for the latter, longitudes agreeing with those deduced from the position of Valparaiso, as determined by my distinguished predecessor. Thus the position of Arica deduced by Mr. Pentland from observations made at La Paz, and carried on by a series of triangles and chronometers to that place, is identical with that deduced from Beechey's longitude of Valparaiso carried on by FitzRoy's chronometrical chain to the Peruvian port.—R. I. M.—*1st Aug.* 1857.

^a See *Journal R. G. S.*, vol. ix. p. 502; also *Daussey's Positions Géographiques*, 1842, p. 67, &c.—ED.

FINAL ARCTIC SEARCH.

When I last addressed you as your President in 1853, it was still my hopeful task, as in the previous year, to urge the Government and the country to send out another expedition in search of my old and honoured friend Franklin and his crews. I then congratulated you upon fresh expectations having been raised by the successful voyage of Lady Franklin's little vessel, the *Isabel*, under Inglefield, and also in anticipation of good results from the large public expedition under Belcher and Kellett. Alas, we know too well what fatalities interfered with the solution of the great problem, so clearly recorded last year by my lamented predecessor. Since this Address was delivered, the light which had been thrown upon the subject, whether by the information and memorials brought home by Dr. Rae, or the exploration down the Back River by Dr. Anderson, has rendered me still more anxious to ascertain the real fate of the *Erebus* and *Terror*, and their gallant crews. Through the unexpected tidings communicated by our medallist Rae, we were no longer allowed to speculate on the course followed by Franklin; the "whereabouts" of the journeyings of some, at least, of our missing countrymen being for the first time made known. Had these traces been discovered two years sooner, what efforts would not have been saved to Great Britain and America! All the endeavours of Belcher and De Haven to penetrate northwards by Wellington Channel, as well as those of Kellett to communicate by a north-western course with Collinson and McClure, and the almost superhuman struggles of Kane to reach a Polar basin—all these might have been averted! The daring efforts to penetrate with ships through the intricate channels which separate the great islands of the Arctic Archipelago, would have been stopped by that one fact, and the Government would have known how to dissipate at once the mystery which still hangs over the fate of the missing vessels and a large portion of their crews.

Is it, therefore, to be wondered at that many men of science willingly signed a memorial,* beseeching the Government to make a final endeavour to search efficiently the area, at the edges of which

* This document, which was prepared by myself, the list of subscribers being headed by Admiral Sir F. Beaufort and General Sabine, was most kindly received by Lord Palmerston in June, 1856, a month after the last Anniversary of this Society. My predecessors, Lord Ellesmere and Admiral Beechey, were among the subscribers, as well as Lord Wrottesley, who in his last Anniversary Address to the Royal Society handled the subject with great effect. See *Proc. Roy. Soc.*, No. IV.

the relics were discovered, and where the Esquimaux reported, that some of the wanderers were last seen? I regret to say that notwithstanding the kind consideration of the Prime Minister, and the hopes we were led to entertain, the limited search asked for has been withheld, and Lady Franklin has once more been thrown upon her own resources, to terminate that inquiry which my friends and associates felt it to be the duty of the nation to complete.

The intense feeling displayed on this subject by our kinsmen the Americans, has been demonstrated by the strenuous efforts made by their Government as well as by Mr. Grinnell. In 1853 I rejoiced with you in learning, that this liberal philanthropist was about to renew with his own funds another Franklin search, and that Kane was about to sail on such a voyage. That noble young man, as I have already shown, extended far the northern limits of Smith Sound, at the head of Baffin Bay, and opened out headlands, glaciers, and frozen seas, hitherto unknown to us. This search and all the other trying endeavours were, we now know, made in wrong directions.

If, for example, Collinson had not made extraordinary efforts to force his way to the north-east through packs of ice, but had simply confined his voyage to the channel along the north coast of America, which he found so easy to follow, and by which he brought his ship safely back, and had known that the tract near King William's Land and the mouth of the Back River, the edges of which he actually touched, formed the goal we now desire to reach, the problem would have been for ever solved by him. If, then, there is no obstacle to a renewal of the western route, by Behring Strait and the north coast of America, what difficulty can there be in reaching the north-eastern edge of the limited area sacred to the memory of Franklin, by a ship proceeding to Batty Bay or Wager River, places which our vessels have already reached, and whence they have also returned unscathed? The instructions of Lady Franklin to Capt. Kennedy, the Commander of one of her private expeditions, were, that on reaching that tract where poor Bellot has left his name, a search was to be made south-westwards; and had the suggestion of that clear-sighted woman been followed, she would really have been the first to discover, by her own efforts, the remnants of her husband's expedition.

An ingenious essay, by Mr. Findlay, on the probable course pursued by Sir John Franklin's expedition, which was published in the last volume of our Journal, and in which the directions of the Arctic

currents are delineated, has sustained the idea which I once thought possible, but afterwards abandoned, that the two ships seen floating on an iceberg on the Newfoundland Banks may have been the Erebus and Terror. The same author has recently published an Appendix, in which, supporting his view by letters from parties well acquainted with the seaman who made the observation, he also gives a letter from Captain Ommaney, expressing his concurrence in the same view. With every respect for the opinions of such contemporaries, I cannot yet admit, that the vessels seen floating southwards may have been the Erebus and Terror; nor can I see why they may not have been other vessels. But even if it be granted that the question is to be thus disposed of as respects the ships, it is consolatory to find, that both Captain Ommaney and Mr. Findlay strongly advocate a renewed search, to dispel our ignorance of the only region, whose exploration can solve the great Franklin mystery. Whatever may be thought of Mr. Findlay's view of Peel Sound being closed to the south, his suggestion, that the unexplored tract between the south end of Melville Sound and Victoria Strait is the area, which ought specially to be searched, is entitled to the serious consideration of all those who continue, like myself, to take a lively interest in the solution of this problem, and who are bent upon ascertaining, by positive survey, whether no traces of the ships or their records can be found, and also to satisfy us that no survivors are eking out their existence among the Esquimaux. On this last point I can never forget what I heard from the lips of Captain Hartstene himself. After our Sovereign had in December last visited the Resolute, that token of the good-will of the American people, the British Queen inquired, with the right feeling which is her characteristic, if he thought that any of her poor sailors might be still alive, and the gallant officer assured Her Majesty that, in his opinion, such might well be the case.

A strong tendency towards this belief, has indeed gained much ground since the publication of the admirable volumes of Dr. Kane. One passage from that work has been already cited in the brief tribute I have paid to the eminent man, who, when he was himself in dire want and had unexpectedly procured some fresh supplies of animals, thus exclaims: "How can my thoughts turn despairingly to poor Franklin and his crew? Can they have survived? No man can answer with certainty, *but no man, without presumption, can answer in the negative.*" "Of the one hundred and thirty-six picked men of Sir John Franklin in 1846, Northern

Orkney men, Greenland whalers, so many young and hardy constitutions, with so much intelligent experience to guide them, I cannot realize that some may not be yet alive—that some small squad or squads, aided or not aided by the Esquimaux, may not have found a hunting ground.”

On this subject there has truly been much misapprehension in the mind of the public, owing to their ignorance of the geographical data on which hope is founded. The area within which some of the crews of Franklin were last seen, though much further to the south than the wild islands and headlands of the Arctic Archipelago, in which the *Resolute* and her companions were abandoned, and though easily and safely approached by sea, either from the west or east, is hopelessly cut off from all land furnishing the necessaries of life, by a broad, cold, and sterile region, occupied by a few wretched natives. The individuals of Franklin's expedition who might have survived, if located to the north among the Esquimaux who fatten upon seals and walruses, could by no possibility track their way southwards over these wilds, on which even the reindeer finds no sustenance. It is chiefly in the meridians on either side of the Back River that this sterility prevails; and here it was that Franklin and his former companions, Back and Richardson, suffered so intensely in 1824, that their existence was then nearly terminated.

With such a wilderness between them and any home, the exhausted crew of Franklin, contemplating nothing but starvation in that sterile icy region of central North America, would naturally, as Kane has suggested, seek a refuge among the Esquimaux, in some chosen spot where animals abound.

When we know from the declaration of a highly respectable seaman still living (one indeed of the crew of *Parry*),* that he was on the point of embracing the life of those savages, merely for the allurements of the chase and the wild attractions it offered, we can well imagine that those who were left of Franklin's noble crew, should, according to the dictates of nature, endeavour in like manner to prolong their existence. Let it therefore be impressed on the public mind, *that although the area, on the southern edges of which some of Franklin's people were last seen, has been approached and can be easily again visited by ships, it has never yet been examined;† and also, that though it be to the south of many tracts formerly penetrated, yet is it so cut off by impe-*

* See 'Times,' December 20, 1856, Letter from Mr. John Pead to myself.

† Montreal Island, which has alone been visited, is incapable of affording sustenance even to Esquimaux.

*netrable wilds from the nearest parts of North America, in which food can be obtained, that by no exertion could any survivors of the Erebus and Terror be saved except by sending out a well-found ship or ships to the points nearest to such insulated Esquimaux quarters.**

As you are all acquainted with that appeal already mentioned, which my friends and myself thought it our duty to make to our countrymen on this exciting topic, I am sure you will rejoice with me, that the charge of the expedition, which Lady Franklin has resolved to send out, should have been undertaken by the eminently distinguished Arctic explorer, Captain M^cClintock. Commanding a thoroughly adapted screw yacht, the Fox, assisted by a well-qualified Polar associate, Lieut. W. R. Hobson, with Dr. D. Walker as the surgeon, and provided with a picked crew, this gallant officer will realize all that a firm resolve, a clear head, and skilful calculations can effect.

Let it also be recorded in our volumes, that amid the many generous Englishmen who have responded to the call, the name of Captain Allen Young, of the Merchant Service, stands pre-eminently forward; since this meritorious young seaman, who has already commanded large ships in various seas, has not only volunteered his

* Proposals were made by Lieutenant Bedford Pim and Dr. King to combine a land or river journey with maritime exploration; the former having, indeed, communicated previously a long memoir on the subject to the Geographical Society. Applauding those experienced men for their laudable endeavours to rouse public sympathy to continue the search, and reminding my associates that Dr. King accompanied Franklin in a former voyage, and that Lieut. Pim was highly commended by myself and others, not only for his Arctic researches, but also for his devotion to the cause in proposing to reach the supposed scene of disaster, by traversing Siberia, followed as it was by his march across the ice of Banks Sound to rescue M^cClure,—still, looking to the slender results of the recent land-expedition down the Back River, though carried out with all possible energy by Mr. Anderson, I cannot bring myself to believe that the renewal of any such enterprise can have a satisfactory issue. In fact, as we now know it to be impracticable that an exploring land and river party can convey more food in their canoes than will just enable them to make a hasty and wholly ineffectual search near the mouth of the river, all efforts to explore the adjacent northern tracts where those Esquimaux are chiefly living, among whom some of the missing navigators were heard of, must cease just at the moment and on the ground where they ought to be pursued. No exertions, in short, save those which can be made upon the ice by vigorous men proceeding from a well-supplied ship, can succeed in really ascertaining the fate of the crews of the Erebus and Terror. Other memoirs, suggestive of different plans for the most effective search after the relics of the Erebus and Terror, have been recently sent to the Society; thus evincing the great interest still taken by the public in the settlement of this question. These memoirs are: ‘On the Discovery-ship Resolute and the Arctic Currents,’ by M. Turnbull; ‘On the Search for Sir J. Franklin,’ by Chief-factor Anderson, communicated by Sir John Richardson; ‘Plan of a Search for Franklin Expedition,’ by Dr. R. M^cCormack; ‘Plan of a future Search for the lost Franklin Expedition,’ by James Parsons.

services, under the command of M'Clintock, but has actually subscribed 500*l.* towards the expense of the expedition in which he sails.* May God, therefore, crown their efforts with success! and may M'Clintock and his companions gather the laurels they so well merit, in their noble endeavour to dissipate the mystery which shrouds the fate of the *Erebus* and *Terror* and their crews!

If, however, this last effort which, in the absence of other aid save that of her friends, Lady Franklin is now making, should fail in rescuing from a dreary existence any one of our countrymen, and should not even a plank of the *Erebus* and *Terror* be discovered—still, for her devotion in carrying out this examination of the unvisited tracts wherein, we have every reason to believe, the ships were finally encompassed, every British seaman will bless the relict of the great explorer, who has thus striven to honour the memory of her husband and his brave companions.

My earnest hope is, that this expedition of Lady Franklin may afford clear proofs that her husband's party came down with a boat to the mouth of the Back River in the spring of 1850, as reported on Esquimaux evidence by Dr. Rae, and thus demonstrate that which I have contended for, in common with Sir Francis Beaufort, Captain Washington, and some Arctic authorities, that Franklin, who in his previous explorations had trended the American coast from the Back River westward to Barrow Point, was really the discoverer of the North-West passage!

In wishing then Godspeed to this private expedition, as I did to all the previous efforts of Lady Franklin, far be it from me to under-rate the zealous endeavours which successive Administrations have made during a series of years, whether to extend geographical knowledge and determine a north-west passage, or more recently to rescue Franklin and his crews—endeavours which will be recorded as among the great glories of Britain, in having brought forth in striking relief the characters of some of the ablest of our seamen, who, formed in that school of severe trial, have proved to be leading men in the late war. These British worthies have now been

* I am happy to announce that, whilst these pages were passing through the press, Petersen, the Esquimaux interpreter, well known to all the readers of the voyages of Penny and Kane, having returned from Greenland to Copenhagen, has, through the instrumentality of our distinguished foreign member Captain Irminger, Royal Danish Navy, and a telegraphic communication from myself, travelled through London and reached Aberdeen in time to join Captain M'Clintock. The *Fox* sailed from that port under Lady Franklin's eye on the 1st July, the whole party on board in the highest spirits.—*July 4, 1857.*

appropriately rewarded by having had conferred on them their hard-earned Arctic medals; and I only regret that their noble feats should not, for the honour of the nation, have been terminated by one exhaustive public effort.

My admiration of these voyagers has indeed been recently enhanced, by the ardour and sincerity with which so many of them have offered their services, to continue the search after the relics of the Erebus and Terror. Such men are truly worthy of any distinction which their country can bestow, and all geographers must agree with me in regarding the Arctic medal which they wear, as an honour second to none which the Sovereign can confer.

CONCLUSION.

In bringing this discourse to a close I have now only to congratulate my associates on the steady rise which this Society has made in the estimation of the public, and on the vast accession to its members in the last few years. Commencing in a striking manner under the guidance of Admiral Smyth, and increasing during the successive Presidencies of myself, the Earl of Ellesmere, and Admiral Beechey, the augmentation has so continued, that we now nearly double the number of members at which we stood during many years.

Besides the vast augmentation of our Map Office, another distinctive feature in our recent progress has been the periodical publication of our Proceedings, which, whilst they record the doings and sayings at our evening meetings, sustain the spirit of the Society, and serve to keep the members, who have been unable to attend our meetings, well acquainted with the passing events.

Putting forth the substance of what is spoken as well as read, these periodical reports impart vitality to our Society, and will in future times be consulted with interest, as expressing the current opinions of British geographers and travellers "*de die in diem*;" a result for which we are mainly indebted to our able and zealous Secretary, Dr. Norton Shaw, who, in addition to the editorship of our Journal, has recently taken upon himself the whole of the editorial duties connected with this new publication.

Whilst the masses of our countrymen, it must be admitted, are better pleased with the news of the day, than with scientific discussions, many of the topics of which we treat are so popular, as well as important, that an enlightened portion of the press merits our best thanks for endeavouring to do justice to the promotion of those geographical researches in which we are embarked. It would be truly surprising if this were not so amongst Englishmen, whose

colonies extend to the Antipodes; and who have, therefore, more grounds than any other nation, for making themselves well acquainted with the surface of the earth, its productions, and inhabitants. I rejoice then to see that our numbers have so increased since my last Presidency, that adequate as we then thought the present apartments would prove for our wants, we already find that they will not by any means contain our members. Assisted, however, by Her Majesty's Government with an annual grant for keeping up a public Map Office, and enjoying a good balance at the banker's, there can be no difficulty in remedying this temporary inconvenience; and when the next Anniversary arrives, I trust that we shall be assembled in halls well adapted to accommodate us, including those ladies also who, following the example of their illustrious countrywoman, Mrs. Somerville,* take a deep interest in geographical science; for there is nothing more encouraging than to see the fair sex gathering information amongst us, to be by them communicated to the sons of England.

At the same time, whilst we maintain our popularity, we must render our annual Journal as far as practicable, not merely the exponent of interesting travels, but also the index of the progress of physical and comparative geography strictly so called, since we reckon amongst our associates, men who are competent to realize every wish to which the scientific geographer can aspire.

In thanking you, Gentlemen, for your friendly support, let me say, in conclusion, that when I undertook to stand in the breach occasioned by the death of my gallant friend Admiral Beechey, I did so under the persuasion that I could not execute more than one session of labour, considering that I had other scientific and official duties to perform. Feeling, however, that I may still be able to serve you for another year, I have, in compliance with your flattering request, consented to retain that which I consider to be as distinguished and useful a post as a man of science can occupy.

* In announcing that a new edition of Mrs. Somerville's remarkable work on Physical Geography is about to appear, I am happy to be able to state, that whilst we are taking measures to secure a permanent meeting-room, the Senate of the University of London and the Council of the Royal Society have acceded to the request of the Council of our Society, and have granted us the use of the large rooms at Burlington House for our ordinary meetings during the ensuing Session.—*July 12, 1857.*

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1857.

Thirteenth Meeting (ANNIVERSARY), 1 P.M., May 25th, 1857.

The President, SIR RODERICK I. MURCHISON, in the Chair.

The Minutes of the previous Meeting were read and confirmed. The Regulations respecting the Anniversary Meetings were next read, when the President appointed William Bollaert and John Brown, Esqrs., Scrutineers for the Ballot.

The Report of the Council, with the Balance-sheet for 1856, and the Estimate for 1857, was then read and adopted.

The PRESIDENT next delivered the Founder's Gold Medal to the Right Hon. H. Labouchere, Her Majesty's Secretary of State for the Colonies, on behalf of Mr. Augustus C. Gregory, Commander of the North Australian Expedition, for his explorations in Northern and Western Australia.

The Patron's Gold Medal, awarded to Lieutenant-Colonel Andrew Scott Waugh, of the Bengal Engineers, Surveyor-General of India, for his geodetical operations and triangulation of that country, was delivered to Colonel George Everest, F.R.G.S., etc., for transmission to Colonel Waugh.*

The PRESIDENT then read his Anniversary Address, for which a unanimous Vote of Thanks was passed, with a request that he would allow it to be printed.

The Ballot being concluded, the Scrutineers reported that the changes advised by the Council had been adopted; and the President announced the two vacancies in the offices of Vice-Presidents, occasioned by the deaths of Rear-Admiral F. W. Beechey and the Earl of Ellesmere, to be supplied by Colonel G. Everest and Sir Walter C. Trevelyan; the vacant Honorary Secretaryship to be filled by Francis Galton, Esq.; and those in the Ordinary Councillors

* For these Awards and the President's Address see No. X.

produced by the retirement of Lord Colchester, Sir Charles Fellows, Rear-Admiral FitzRoy, William J. Hamilton, Esq., the Earl of Harrowby, Colonel J. E. Portlock, and the Earl of Sheffield, to be filled by Lord Broughton, Captain Collinson, R.N., John Crawford, Esq., H. Raper, Esq., R.N., Colonel Sir H. Rawlinson, and Major-General Sabine, R.A.

The Thanks of the Meeting having been voted to the President, Vice-Presidents, Members of the Council, Auditors, and Scrutineers, the President finally directed the attention of the Meeting to the usual Anniversary Dinner, and the Meeting adjourned at half-past 3 P.M.

Fourteenth Meeting, June 8th, 1857.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS.—*Major-General A. Alexander, Mr. W. H. Hovell, and Mr. R. Sweeting, were presented on their election.*

ELECTIONS.—*Commander R. D. Aldrich, R.N.; Rev. G. R. Gleig; Capt. F. Hughes, Madras Cavalry; Colonel the Hon. J. Lindsay; Capt. A. P. Ryder, R.N.; Capt. Allen Young; and Messrs. A. C. Blackstone; Cornwallis R. Cartwright; John Dobie, Surgeon, R.N.; Edward John Eyre, Lieut.-Governor of St. Vincent's; Samuel Gurney, M.P.; Abel Smith; Horace Smith; Philip Smith; and Henry White, were elected Fellows.*

DONATIONS.—The following were among the donations to the Library and Map-Rooms received since the previous meeting:—‘Maps of the Crimea, Erzrum, Khiva, &c.,’ published by the Topographical and Statistical Dépôt of the War Department; eight sheets of the Admiralty charts of the Delta of the Danube; Sir John Davis’ ‘China;’ The Transactions of the Franklin Institute of Philadelphia; of the Academy of Sciences of Paris; of the Zurich Natural History Society, &c.

EXHIBITIONS.—Among the articles exhibited were fragments of ancient pottery found on Serpent Island by Capt. Spratt, R.N.; an original plan of Alexandria, by Capt. Mansell, R.N.; and maps of St. Miguel and Caledonia Bays, &c., by Mr. Lionel Gisborne, F.R.G.S.

ANNOUNCEMENTS.—The President announced the return of Dr. Elsey, F.R.G.S., the surgeon of the North Australian Expedition; of Mr. A. W. Twyford, recently attached to the Egyptian Nile Expedition; and also of Sir Robert Schomburgk, F.R.G.S., from the Consulate of Samana, in St. Domingo, *en route* to that of Siam.

The Papers read were :—

1. *On the Battles of Sellasia, Marathon, and Thermus.* By Lt.-General JOCHMUS.

GENERAL JOCHMUS explained that these papers had been written in Greece, between the years 1830 and 1834, when he was Aide-de-camp to General Sir Richard Church, Commander-in-chief of the armies during the war of Greek independence ; or later, when he was employed as a captain in the Greco-Bavarian service, at Athens. The above manuscripts had been presented to the Royal Geographical Society in 1853, together with others,* written in English, which have already been published by the Society ; but the present manuscripts required translations from the French and other preparations prior to being printed. In referring to, and commenting on the eight maps which accompany the above manuscripts, General Jochmus pointed out how the ancient geography of some districts in Greece was elucidated by commentaries like these on the old military operations in those countries, and *vice versâ*, how the study on the spot of those military operations had assisted him in determining, amongst others, the sites of Thermus and of Metapa (Polybius, lib. 5), the site of Marathon (already identified before him with the position of modern Vranà by Colonel Leake), the probable extension of the Greek and the Persian lines of battle, and the number of troops engaged at Marathon (Herodotus, Plutarch, Thucydides, &c.). General Jochmus further showed how he had determined the sites of the ruins of Sellasia, its subterranean spring mentioned by Pausanias, and of the battle-field † between Antigonus and Cleomenes in its immediate neighbourhood. It was also stated how he happened to discover in 1834 the sites of all the places and monuments mentioned by Pausanias in his description of the road from Argos to Sparta, viz. the Ruins of Caryae, the Trophy of Hercules, the Temple of Jupiter Scotitas, the Statue of Apollo at Thornax, &c. Finally, General Jochmus, by referring to the eighth map representing a part of Laconia and Cynuria, showed how he had been enabled to trace thereon the following military positions and operations :—1st. The Camp of Epaminondas advancing against Sparta after the battle of Leuctra ; 2nd. Philip in order of battle opposed to the Spartan army, after the fight on the Menelaion ; 3rd. Battle field of Sellasia ; 4th. Philopœmen in ambush in the forest of Scotitas ; 5th. Philo-

* A Journey into the Balkan, and Comparative Commentaries on the Marches of Darius, Alexander, and Marshal Diebitch, between the Danube and the neighbourhood of Constantinople ; also, Notes on the Water Communication in Asia Minor.

† B.C. 221.

pœmen encamped at Barbosthenes before the battle against Nabis, A.C. 192; 6th. Titus Quinctius encamped at Caryae, A.C. 195; 7th. Philopœmen at Caryae, A.C. 192. (*See* Pausanias, Xenophon, Livy.)

The PRESIDENT expressed the thanks of the Society to General Jochmus for his communication. Although a period of twenty-five years had elapsed since the General visited these spots, yet he had described them with all the freshness of his youth, and had given such a clear account of them that, with the aid of the large and graphic charts exhibited, every one might have followed him. They were much obliged to General Jochmus for having, as a practical soldier, described these ancient positions. It should not be forgotten that we were glad to receive such valuable contributions on comparative geography; as the objects of the Society were not confined to the cultivation of physical geography and the exploration of unknown countries.

The BISHOP of ST. ASAPH, F.R.G.S., said there was one point of view in which he thought communications of this kind peculiarly valuable—and that was that they verified history. In this instance, after nearly 1500 years, a military man, an able judge of the matter, went upon the ground and found all the details such as they were described in history. The value of that fact, to his mind, was this—that it gave a person a confidence in history which nothing else could provide. This was peculiarly the case with respect to the Holy Land. The investigations that had taken place in that land had every one of them proved the truth of sacred history. It was so many years since he had studied these matters, that he was not able to speak to the details of General Jochmus's communication; but he was fully aware of the extreme value of a soldier's investigating military matters, and reporting them to scholars, who were able by comparison with ancient history to prove that history true.

MR. GEORGE BRENT, F.R.G.S., said that, as he had been entrusted by the Secretary with the duty of revising the translation of General Jochmus's papers, it might be proper that he should say a few words. He had found the task one of pleasure; the papers were written with learning and taste, and, moreover, in excellent French. One thing which forcibly impressed him was the great advantage there was in examining localities mentioned by ancient authors with the book of the author in one's hand, as had been done by General Jochmus in this instance. The advantage was most obvious. Had the same plan been pursued by modern authors, instead of theorising at a distance, with the aid of very imperfect maps, many doubts and difficulties would not have existed with reference to the writings of ancient authors, which did exist in the present day. In going through the manuscripts, another circumstance which struck him was the correct appreciation the General had of the labours of Colonel Leake, whose researches in Greece had placed him in the first rank of comparative geographers. Wherever General Jochmus had found occasion to dissent from Colonel Leake, he had stated his views and opinions with so much candour and exactness, that they could not be without their weight upon the mind of the Colonel himself. Another idea which had forced itself upon his attention was, the great advantage which would accrue if any of the Fellows of the Society, who had leisure at their command, would in the same way examine localities in our own country having reference to military actions which took place in dark periods of our history, of which we had only obscure notices, and ascertain the real truth of the matter—which could only be done by observations upon the spot. If it were true that the earth was interesting as the abode of man, surely those spots on its surface which had been the scenes of events that had materially affected the destinies of our race, must be among the most interesting portions.

MR. CHARLES BRACEBRIDGE, F.R.G.S., begged to make one observation. It was that the late Dr. Arnold, upon receiving from him a Map of the Morea, drawn up after the survey of the French, made the very natural, but perhaps not known, observation that, until this map came into his hands, he did not understand the wars of Greece. It was well known that Dr. Arnold was for many years occupied in writing comments on the history of Greece, and such was his appreciation of that beautiful survey, which had made us acquainted with the ravines, the heights of mountains, the ancient causeways, the tracks of commerce, and the topography of different localities. He believed that some of these spots—the plains of Argos, for instance—no scholar could comprehend, unless he saw the beautifully illustrated map made in that survey of the Morea.

The PRESIDENT said, as reference had been made to Colonel Leake, he begged to state that the communications of General Jochmus had been submitted to that accomplished scholar, who had strongly recommended their publication.

The second Paper read was—

2. *Remarks on Serpent Island.* By Capt. TH. SPRATT, R.N., C.B.

[This Paper has been directed to be published in the Journal.]

The PRESIDENT observed that the distinguished nautical surveyor, Captain Spratt, whose papers on different parts of the adjacent coasts had been read at various times to the Society, had given a very clear account of this singular island. As a geologist he might say that, if the structure of rocks was to be the ground for the construction of empires, Serpent Island being of the same composition as the adjacent provinces, the question recently agitated might at once have been decided.

MR. W. J. HAMILTON, F.R.G.S., as an old friend of Captain Spratt, and having given him his first lesson in geology in the neighbourhood of Smyrna, took great interest in anything Captain Spratt said upon the subject. The various papers, he had read before the Geological Society, were quite enough to show that he had made very rapid progress in that science. With regard to the observation made by the President, if the question of political configuration was to be decided by geological constitution, he believed this island would be found to form a sort of connection between Bulgaria and the Crimea.

The third Paper read was—

3. *On the Hydrography of the Valley of the Arve.* By Professor PAUL CHAIX, of Geneva, Corresponding F.R.G.S.

Addressed to the Secretary.

[This Paper has been directed to be published in the Journal.]

The PRESIDENT said that Professor Chaix's communication was one of value, more particularly with reference to the changes in physical geography produced by modern causes; and also to geologists, in forming their calculations as to what must have passed in vast periods of time.

The fourth Paper read was—

4. *A Notice of a late Exploration of Darien.* By Dr. H. C. CALDWELL, of the U. S. frigate Independence.

Communicated by JOHN POWER, Esq., F.R.G.S., of Panama.

During an official expedition made towards the end of last year to the Gulf of San Miguel, for the purpose of reporting on the facilities of obtaining lumber suitable for ship building, Dr. H. C. Caldwell, surgeon, U. S. ship Independence, who accompanied it, met with Mr. Andrew Hoseac of Chepigana, from whom he learned the particulars of the explorations made by Dr. Cullen, Mr. Gisborne, Capt. Prevost, R.N., and Lieut. Strain, of U.S.N., in 1853, and also that, in Mr. Hoseac's opinion, based upon information derived from the Indians, there existed a comparatively level tract of land between Fort Principe, on the Savanna river, and Caledonia Bay, on the Atlantic, in a direction *more northerly* than that followed by Capt. Prevost, of H. B. M.'s ship Virago, in 1853.

On his return to Panama, Dr. Caldwell obtained from Commodore Mervine leave of absence for three weeks, and, accompanied by a sailor from the Independence named Parker, set out with the intention of exploring this new route. Having reached Chepigana, every assistance was rendered to him by Mr. Hoseac, but the greatest difficulty was experienced in procuring men to accompany him; all giving as an excuse their dread of the Indians, &c., &c. At last, an Indian to act as interpreter, his nephew, a lad of fourteen, and a negro, were prevailed upon to go; and on the 5th of April the party started from Chepigana and reached Principe on the morning of the 6th.

The next day, the party started in a northerly direction, cutting their way through a thick undergrowth of palms, vines, and thorny bushes; the bed of the river was crossed during the day four or five times—an insignificant stream running in a watercourse 20 to 30 yards wide. Captain Prevost's track was also crossed, the cutting through the bush being still distinguishable; and on a tree was found cut the words, W. JONES, VIRAGO, DEC. 1853. The distance travelled this day was estimated at about six or seven miles, and an elevation was reached of about 160 feet, as near as it was possible to judge without measurement. For the next three days the country crossed still continued to be thickly wooded, of a gently undulating or almost level character, intersected in different directions by numerous watercourses, and in some parts the ground seemed to be swampy during the rainy season. On the fourth day two shots were heard, apparently quite near, and said to be from some of the

Indians on the Atlantic side; marks of a trail were also seen, and also a tree recently cut. The whole party suffered much for want of water, which was very scarce, and in hunting for which much delay was caused. The negro peon, being in fear of the Indians, persuaded the Indian interpreter and boy to return, and neither threats nor promises could induce him to proceed. At evening on this the fourth day the Atlantic was seen from the top of a tree, through a gap in the hills, in a N.E. direction, apparently about 10 miles distant. The following morning (the fifth day) the Indians and negro retraced their steps, and Dr. Caldwell and Parker continued their route, cutting their way with much difficulty through the bush, and suffering still from want of water. Two more shots were heard in the woods this day.

Towards evening, on ascending a tree, the gap in the Atlantic range was again distinctly visible, distant about five or six miles; but the want of water and provisions compelled the Doctor to return, and on the morning of the eighth day he reached Principe, where he fortunately found the Indians and negro with the canoe, they having, in the mean time, returned to Chepigana, whence they had been compelled by Mr. Hoseac to go back and await the arrival of the party.

Dr. Caldwell believes that the summit between the two oceans was crossed on the *first* day's march near Principe, and that thence to the Atlantic there was a gradual descent. This agrees with the accounts furnished to him by various Indians in Chepigana and Yavizo, especially with regard to the gap through which the Atlantic was so distinctly visible.

This route Dr. Caldwell considers well worthy of being scientifically examined, and he expresses no doubt of his being able, by following the path he has cut, to reach the Atlantic from Principe in four days at the outside. Not having taken any instruments with him, Dr. Caldwell does not profess to give more than an approximation to the heights and distances.

MR. L. GISBORNE, F.R.G.S., had been twice to the Isthmus of Darien, and he had heard the paper with great interest, because it showed that the author had fallen into the same error that he (Mr. Gisborne) had, on his first visit. The only difference was that he did not fall in with Indians. Dr. Caldwell stated that, on the fourth day, he saw the Atlantic. The Society had in their archives his own report on the last expedition to the isthmus of Darien. It was undertaken at the request of the three Governments of France, England, and America, and with the consent of the Government of New Granada, and he might, therefore, call it an official survey. They found out for the first time that the whole coast on the Atlantic was eight miles out of longitude—an error so important, that another explorer of Darien, Captain Prevost, who, he believed, was the first that went so far into the interior, starting from the

same place that Dr. Caldwell did, with the best Admiralty maps before him, and intending to proceed to the east coast, found that he was steering towards a point really 25 miles to the north of it; the geographical error in the position of Caledonia having misled him that much. This error was corrected by the surveys which were undertaken in 1853. With respect to Dr. Caldwell's paper, all the information he had collected was evidently wrong. The summit of the range was within five or six miles of the Atlantic; and that range consisted of mountains from 900 to 1000 feet high. There was a map upon the table, the official map sent there from the Admiralty, which showed the different heights taken by instrumental observations, with spirit levels, or mountain barometers. As to a ship-canal across *this* portion of the isthmus, he (Mr. Gisborne) really considered it to be an absurdity. The ridge was like a backbone. He had walked along the top of it for miles and miles together, and it was so narrow that few men could walk along it abreast.

THE PRESIDENT.—Is there not any point of depression?

MR. GISBORNE.—There is none. The sources of all the rivers were from 500 to 700 feet above the level of the sea; it was, therefore, impossible to suppose that there could be any break in the mountains below 700 feet. That alone would render the question of a canal in this spot impossible. He had levelled the range instrumentally and barometrically, and there was no point in it that was less than 900 feet high. This might be taken as an established fact. He had also made a survey of the Caledonia, with the object of following the traces of the Americans, who, under Lieut. Strain, were upon that river in a state of starvation. He had with him a copy of a map of the river, made by a Spanish officer 130 years ago, and the survey made by himself placed a position within a short distance of the spot where the Spaniards had placed it so many years before. Now that his own surveys had been completed, and the report placed in the possession of the Society, he hoped they would let it go forth to the world that a ship-canal across the Isthmus of Darien, as far as geographical difficulties were concerned, was perfectly impossible.

Fifteenth Meeting, June 22nd, 1857.—[Final Meeting of the Session.]

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS.—*Horace and Philip Smith, Esqrs., were presented upon their election.*

ELECTIONS.—*M. de la Roquette, Vice-President of the Geographical Society of Paris, as an Honorary Member, and M. Malte-Brun, Secretary of the Geographical Society of Paris, as a Corresponding Member. Commander E. Burstal, R.N.; Capt. H. Caldwell, R.N.; the Rev. H. J. Hose, Warden of St. Paul's College, Sydney; the Right Hon. H. Labouchere, M.P.; and Messrs. J. W. Brett; G. M. M. Esmeade; William Evans, M.P.; F. P. B. Martin; T. A. Noddall, R.N.; and A. D. White, were elected Fellows.*

DONATIONS.—The following were among the donations received since the former meeting:—‘Index to the Ordnance Survey of Lancashire;’ ‘Blackie's Imperial Atlas of Modern Geography;’ ‘Observations made at the Magnetical and Meteorological Observatory

at Toronto,' 4to.; Transactions of the German Oriental Society; the Darmstadt Geological Society; the Academy of Sciences of Paris; and the Statistical Society of London.

EXHIBITIONS.—Three very beautiful sketches of Eastern and Western Siberia, by Mr. T. W. Atkinson, made during his Seven Years' Journey in those regions, were exhibited at the meeting.

ANNOUNCEMENT.—The President announced that through the activity and zeal of their Corresponding member at Copenhagen, Captain Irminger, of the Royal Danish Navy, the services of the well-known Esquimaux interpreter, Carl Petersen, had been secured for the Arctic Expedition under the command of Captain M'Clintock, R.N., which would sail immediately on the arrival of the interpreter at Aberdeen.

The Papers read were:—

1. *Description of Vancouver Island.* By Lt.-Col. W. C. GRANT, F.R.G.S.

The position of Vancouver Island is between $48^{\circ} 20'$ and $51^{\circ} N.$ lat., and between 123° and $128^{\circ} 20' W.$ long. It is situated on the western coast of North America, within a short distance of the mainland, the Straits of Fuca, which separate the island from the mainland on the south, forming the boundary in those parts between the British territories and those of the United States. The extreme length of Vancouver Island from north to south is 270 miles, with a general breadth of from 40 to 50 miles. The general aspect of the island is that of a broken rocky country densely covered with timber. The proportion which the available land bears to that which is totally incapable of cultivation is extremely small. The whole centre of the island as far as it has yet been explored consists of a barren rocky waste, the timber with which it is covered being, as well from its nature as from its position, unavailable for any useful purpose. Along the sea-coast a few patches of level land are to be met with, where the timber is extremely fine, and suitable either for masts and spars or for being sawn into planks. Small spots of open land, clear of trees, occasionally intervene, but seldom of more than a few hundred acres in extent; on these spots the soil is almost invariably extremely rich, and will produce abundantly every description of crop grown in Great Britain. The climate is agreeable and healthy, the summer is warm and dry; no rain falls from March till November; the remainder of the year is rather a rainy season than a severe winter; some snow falls, but does not generally lie long on the ground; and the frosts are neither hard nor of long duration.

The deposits of coal on the island are extremely rich, and are in many places favourably situated for export. The seas by which the island is surrounded teem with fish of almost every description. The salmon and herring are particularly numerous, cod and sturgeon also abound, and several whales are annually caught by the natives at a short distance from the coast. The prevailing geological structures in the higher parts of the island are the gneiss and mica schist systems; in the lower, greywacke and clay-slate prevail. These are intersected by several dykes of igneous rock; and on the sea-coast basins of sandstone and of limestone occasionally occur. The native population of the island is calculated at from 15,000 to 20,000 souls; who are divided into numerous tribes, many of whom speak languages entirely different from each other. They are in general a harmless race, they live almost entirely by fishing, they are willing to work for the white man, but their labour cannot be depended on continuously. The island is still in its infancy as a colony; it possesses numerous safe and commodious harbours, is favourably situated for export to Oregon, California, the Sandwich Islands, Central and South America, Australia and China; and though now but little known, Vancouver Island cannot fail eventually to be of very considerable importance. The object of this paper is to make its position, its products, its natural resources, and its history, better known to the British public.

In answer to questions as to the climate, the adaptability of the island for colonisation, its mineral productions, &c., COLONEL GRANT said the climate was delicious for travellers, as from April to September there was no wet. This absence of humidity, however, was somewhat unfavourable for agriculture. With respect to colonisation, he thought Vancouver Island fitted for it, to a certain extent. The available arable land was small in proportion to that which was useless, so that it could never support a large population. The wheat and vegetables grown were very fine indeed. The island had not been surveyed, except a small portion by the Hudson Bay Company, and of that part about two-thirds were fit for agricultural purposes; the remaining third was useless rock. The quantity of coal discovered at present was small, but it was fitted for steam purposes.

SIR HARRY VERNEY, F.R.G.S., asked Colonel Grant whether the natives in the different parts of the island could communicate with each other, whether their languages were similar; and also whether there was any trace of any patriarchal government that had at any former period ruled over the whole of the island; also whether there was any trace of religion among the natives, whether it was a common religion, and whether there were any missionaries there?

COLONEL GRANT said that he had never been able to trace any real religion among them. They had some traditions excessively childish in their nature, and which did not point to one common object. They were scarcely aware of the existence of a supreme Being, though some had a glimmering notion of such a Being. One missionary informed him that they worshipped the sun, but he thought this too noble a superstition to exist in the breast of such a

grovelling race of Indians as they were. They had a few superstitions among them. There were among them several most zealous Roman Catholic missionaries, who were incessant in their endeavours to implant Christianity. The savage was very ready to take any impression, but his mind was incapable of retaining any fixed idea, and the missionaries had consequently been unable to make any permanent progress. There were three languages in the island; the prevailing one was the Cowitcheu. The languages again were subdivided into various dialects, so that the different tribes speaking them could, with some difficulty, understand each other. There was not the slightest trace of a common patriarchal government. Each tribe had a patriarchal government, because each tribe formed a family something like our clans in Scotland.

MR. KENNETH SUTHERLAND, F.R.G.S., remarked that our Government had sent an expedition to Nootka Sound towards the end of the last century.

COLONEL GRANT said the object of Vancouver's expedition was to discover the North-West Passage, and in trying to discover it he saw a large inlet, which he immediately proceeded into, thinking it would conduct him to the opposite coast of America, and that he had found the long sought North-West Passage. He followed the channel and learned that he was sailing round an island, and he was much disappointed in finding himself in the Pacific again. In going round the island he met two Spanish vessels coming from Nootka, and they first told him that he was sailing round an island. He then went round to Nootka and gave the Spaniards notice to quit.

MR. MONCKTON MILNES, F.R.G.S., asked whether Colonel Grant had ever turned his attention to the practicability of rendering the island a convict settlement?

COLONEL GRANT was afraid that it would not make a good convict settlement, on account of its contiguity to America. Access to the continent across the channel was easy, and to prevent the convicts escaping, a large military guard would be required.

THE REV. BRYMER BELCHER, F.R.G.S., believed what had been said about the missionaries in Vancouver Island was quite correct. At present there were no missionaries in the island, except some Roman Catholics, who had been engaged there several years. The Hudson Bay Company had a chapel at Victoria, and about a year ago an unordained labourer, a catechist, was sent out by one of the great missionary societies of this country to the southern part of the island. The gentlemen who brought their geographical knowledge to bear upon the missionary work of the Church, had looked on Vancouver Island as an unoccupied field, and had directed the attention of the Society for the Propagation of the Gospel to it. A grant of 250*l.* had been expended in sending out two missionaries. The population amounted to between 20,000 and 30,000 of native inhabitants, according to the last census given by the Hudson Bay Company. With respect to the climate and nature of the country, all the information that the Society had been able to obtain, went to show that there was nothing in either respect which the Anglo-Saxon race might not most easily overcome. The coal, to which allusion has been made, he had reason to believe, was spread over a large field, and was of very excellent quality, well suited for furnaces and for steam purposes. With coal and wood, and with what, there was every reason to believe, would be found in mineral products as well, Vancouver Island appeared to him to be one of the most promising fields open to the English settler.

MR. R. BLANCHARD, F.R.G.S., late Governor of Vancouver Island, begged leave to offer an observation with regard to the population. Colonel Grant estimated it at 17,000, and Mr. Belcher at between 20,000 and 30,000. When he was there he took great pains to make inquiries of the people who, he considered, were best qualified to judge, and they stated the numbers to be, at the outside, 10,000, and that the population was decreasing.

THE PRESIDENT, in closing the discussion, said it was evident that the island was destined to become a valuable possession of the British crown. The position it occupied, and the mineral riches it contained, with the probability of finding more, all tended to indicate its future value to our country.

The second Paper read was—

2. *Continuation of the Report of the North Australian Expedition.**

Communicated by the Right Hon. H. LABOUCHERE, F.R.G.S., H. M. Secretary of State for the Colonies.

Sydney, 7th January, 1857.

SIR—I have the honour to transmit, for the information of his Excellency the Governor-General, an outline of the proceedings of the North Australian Expedition, from the period of leaving the Victoria, on the 21st June, to the 16th December, 1856, when the expedition reached Brisbane.

2. The exploration of the interior, beyond the sources of the Victoria River, having been carried to the full extent that the resources of the expedition would admit, I made preparations for carrying out that part of the instructions relating to the exploration of the country between the Victoria and Albert Rivers.

3. In making these arrangements it was desirable to provide against any contingencies which might prevent the land party obtaining supplies from the Tom Tough at the Albert River, which I had appointed as a rendezvous for the expedition; and it thus became necessary to reduce the land party to such a number that the horses now remaining could convey a sufficient supply of provisions for the whole journey to the out-stations in New South Wales, should we be compelled to do so, without further assistance.

4. I therefore organized a party of seven persons, consisting of myself, Mr. H. Gregory, Mr. Elsey, Dr. Mueller, C. Dean, R. Bowman, and J. Melville.

5. For the transport of this party and its equipment, only thirty-four horses remained out of the fifty originally embarked at Moreton Bay. Of these, seven were appropriated as saddle horses, and the remaining twenty-seven for the conveyance of the stores, &c., which comprised 1060 lbs. flour; 872 lbs. pork; 350 lbs. sugar; 380 lbs. meat; — biscuit; 100 lbs. rice; 30 lbs. sago; 32 lbs. tea; 30 lbs. coffee; 2000 rounds of ammunition; instruments; clothing; spare harness, &c.,—the whole weighing about 2 tons, exclusive of packages.

6. Having instructed Mr. Baines to embark the remainder of the exploring party and stores in the Tom Tough, and proceed to

* See former Nos. of the Proceedings of the Royal Geographical Society.

Coepang for supplies of fresh provisions, and thence to the Albert River, to co-operate with the land party, I left the camp on the Victoria River on the 21st June, 1856.

7. Proceeding up the Victoria to the eastern bend in latitude $15^{\circ} 38'$, left the river on the 26th June, and followed up a large creek, coming from the eastward. The country at first was very rocky and of indifferent quality, except on the immediate bank of the creek, till we approached its source, when the sandstones were replaced by basaltic rocks, and the country changed to fine open grassy ridges, very thinly wooded.

8. Beyond this creek (latitude $15^{\circ} 33'$, longitude $131^{\circ} 40'$) a low sandstone table land commenced, elevated about 700 feet above the sea. The country now changed to thinly-grassed stringy-bark forest, destitute of watercourses, except a small creek which we struck in latitude $15^{\circ} 30'$, longitude 132° . As no water appeared to exist except in this creek, I followed it down to the N.E. to latitude $14^{\circ} 54'$, longitude $132^{\circ} 30'$, where it turned to the N.W.; but after five days' reconnoitering, succeeded in finding a passage to the E. across the table land (which appeared to be the northern extension of the interior desert) to a small creek, tributary to the "Roper" River, and moved the party to it on the 12th July.

9. Attempting a S.E. course, we were repulsed by a scarcity of water, and had to trace down the creek to its junction with the Roper, in latitude $14^{\circ} 58'$, longitude $133^{\circ} 20'$. The country improved, and was well suited for pastoral purposes, the rocks being basaltic.

10. Having followed the Roper 20 miles to the N.W., I again returned to a S.E. course, re-entering a poor sandstone country; and on the 18th July encamped on a small creek with a few waterholes.

11. In the afternoon a small party of blacks were observed watching the camp, and, on finding they were discovered by us, came up, but would not speak a single word, and soon after retired, but were detected stealing into the camp at night, when a discharge of small shot compelled them to retire.

12. The following day continued a S.E. route, encamping at a spring in a sandstone ravine, where the grass was very inferior, and we experienced some difficulty in keeping the horses near the camp, their instinct doubtless leading them to avoid a spot where poisonous plants existed, as the next day at noon two horses were taken ill, and died in less than an hour after; the stomachs, on examination, showing the action of violent poison.

13. We continued to traverse a very indifferent country, with flat-topped sandstone ridges, between scrubby valleys, in which small

creeks took their rise, and trending to the N.E., form the heads of the "Wickham" and "Limnin Bight" Rivers.

14. Scarcity of water, however, compelled us to turn to the northward, and travel along the broken sandstone country at the edge of the table land, reaching the "MacArthur" River on the 4th August, in latitude $16^{\circ} 25'$, where the channel did not exceed 20 yards in width; and so little water remained, even at this season, that it had to be followed down for some miles before a sufficient supply could be obtained.

15. Being desirous of keeping as far inland as possible, I again struck S.E., crossing the spurs of the table land. In the valleys between, many small creeks took their rise, and form the heads of the rivers which flow into the Gulf of Carpentaria.

16. The principal feature of the country was sandstone, though basalt and limestone frequently cropped out, and formed small tracts of grassy country, which seemed to expand to the north of our route; but to the south, the sandy table was almost unbroken.

17. The elevation of this table land gradually increased to about 900 feet above the sea, and in latitude $17^{\circ} 40'$, longitude $137^{\circ} 40'$, a spur, or rather a detached mass of greater altitude (1300 feet) projected from it to the north. From its higher ridges the view extended for 40 or 50 miles to the south; all was hopelessly level, and without a single marked feature.

18. 20th August.—Deep gullies took their rise on the S.E. slope of this high land, rapidly increasing, by their junction, into a considerable creek, which proved to be the head of the Nicholson River. Considerable difficulty was, however, experienced in descending into its valley, owing to the abruptness of the ridges, which were formed by the edges of sandstone strata at a high angle, while granite prevailed in the lower ground.


19. The Nicholson, however, soon re-entered the sandstone ranges to the E., over which we toiled for three days, without finding sufficient grass for our horses. Following down the river, the country became more level; narrow grass flats appeared on the banks, but the back country was still worthless, covered with very open scrub or terminalia and melaleuca, to within 30 miles of the Albert River, when grassy plains commenced, and extended several miles back from the right bank of the river.

20. On the 30th August crossed a fine running creek, which joined the Nicholson from the south, in latitude $17^{\circ} 53'$, after which the river turned to the N. Continuing our route E.N.E. for three miles, struck a fine brook of running water, with open grassy plains on its banks; its course was nearly east for four miles, when it was joined

by a small creek from the S., forming a fine reach of water, which we recognized as the Albert River of Captain Stokes, and Beam Brook of Dr. Leichhardt.

21. As the junction of these two branches of the Albert had been appointed as the rendezvous of the two sections of the expedition, it was with some anxiety we approached the spot, though our journey from the Victoria had been so rapid that I could scarcely hope to find Mr. Baines had arrived before us. Our hopes were raised almost to certainty, when in the distance a tree, with an inscription recently cut in the bark, was seen in the exact place appointed, but a closer inspection showed that it was not the work of any individual belonging to the expedition.

22. The following was the inscription, which, cut in large characters, extended round the tree:—

CHUMMLUT +
 ORE
 RCH TO
 1856.

23. The remains of a large fire, the names of some of the boat's crew, and the word "Torch," were cut and scratched on the small trees and stumps around, but nothing to guide us in the search for any papers which would throw light on the subject of the visit.

24. Having marked a tree with the date, initials of the expedition, and instructions for finding a tin canister containing memoranda, which was buried near the tree, I moved the party down to the right bank of the river, half a mile lower down, with the intention of proceeding downwards to the entrance of the Albert; but finding the water salt, I marked a second tree, and buried a tin with a memorandum of the proceedings of the expedition, prospective movements, and instructions for the guidance of Mr. Baines, should he arrive after our departure, as it was not prudent, under existing circumstances, to await the arrival of the vessel.

25. On the 3rd September left the Albert River, and traversed a level open country, thinly clothed with indifferent grass, the soil a brown clay loam. Two days' journey S.E. brought us to a river 100 yards wide, in detached pools. (Latitude $18^{\circ} 12'$, longitude $139^{\circ} 55'$.) This river was mistaken for the Albert by Dr. Leichhardt, and I therefore named it after that enterprising explorer.

26. Soon after we encamped a small party of natives approached, and assumed a somewhat threatening tone, but shortly after retired. On the following morning about twenty came up to us, well armed, and, while we were crossing a deep ravine, made a rush forward to

attack us, but when in the act of throwing their spears were checked by a discharge of small shot, and were quickly dispersed with the loss of their leader.

27. From the Leichhardt our course was nearly E., the country consisting of low sandstone ridges, very thinly timbered, and nearly destitute of grass. A few inconsiderable watercourses trended to the N., in which direction extensive grassy plains appeared to exist. Water was very scarce.

28. The country improved again as the Flinders River was approached, and where we crossed it, in latitude $18^{\circ} 8'$, longitude $140^{\circ} 50'$, the grassy plains extended nearly 20 miles back from the river on both banks.

29. Beyond this again we encountered a worthless country, perfectly level, covered with small trees and melaleuca scrubs. The scarcity of water repulsed us several times in the attempt to pursue an easterly course, and forced the party N. on the meridian of $141^{\circ} 30'$, to latitude $17^{\circ} 15'$, when we reached a broad sandy river bed, which is probably the Gilbert of Leichhardt.

30. The approach of the rainy season, which would prevent us from drying the flesh of our horses, should we require to replenish our stock of provisions, and the general health of the party rendering it desirable that fresh meat for a time be substituted for the salt pork, which had suffered much from the heat of the climate, both in quantity and quality, on the 18th we killed one of the horses, which had become otherwise unserviceable. The meat was cut into thin slices, and dried in the sun. The process occupied two days; the meat was tough, but by long stewing became very palatable, and scarcely distinguishable from beef.

31. The general course of the Gilbert was from the S.E., and this enabled us to resume our course, as a sufficient supply of water existed in its channel, though several miles often intervened between the pools. The country along this river was extremely level: only one ridge of hills was seen till we reached latitude $18^{\circ} 20'$, longitude 143° (27th September), though the bed of the river rose to about 700 feet above the sea level. Grassy flats extended along its banks, from one to two miles wide; beyond which the country was very poor, with patches of melaleuca scrub.

32. Low ranges of hills now rose abruptly from the plain,—the prevailing rocks, slate, porphyry, gneiss, and granite. A decided improvement was also observed in the vegetation.

33. On the 5th October reached the head waters of the eastern branch of the Gilbert, and as it was necessary to reconnoitre the country before moving the party across the ranges, I proceeded

onward with Mr. H. Gregory for that purpose, and had a horse killed and dried during my absence from the camp.

34. On the 11th the party moved across the ranges, which rose about 2,500 feet above the sea level, in latitude $18^{\circ} 45'$, longitude $143^{\circ} 50'$, and encamped on a large sandy creek, tributary to the Lynd River, the southern branches of which we crossed the following day. The lower part of the valley of the Lynd was here about 1,500 feet above the level of the sea, the primary ranges rising abruptly to the W., but the eastern side was formed by a gradually rising sheet of basaltic lava, which separated it from the valley of the Burdekin. This portion of the country was well grassed, but from the porous nature of the rock, destitute of surface water.

35. On the 14th descended into the valley of the Burdekin, and on the 16th reached that river in latitude $18^{\circ} 57'$, longitude $144^{\circ} 50'$. The channel was about 50 yards wide, with a small running stream of water winding along the sandy bed. The country was of a very broken and almost mountainous character, the valley and some of the lower ridges well grassed and suited for stock, the higher ranges usually poor and stony.

36. Except in the river itself, surface water was very scarce at this season, and our route consequently along its right bank; the general course S.E.

37. Below the junction of the "Clark," the country improved considerably, large tracts of basaltic rock forming very fertile land by its decomposition.

38. South of latitude 20° granite and trap prevailed, forming fine open grassy ridges, timbered with iron bark; and this continued to latitude $26^{\circ} 40'$.

39. Reaching the junction of the Burdekin with the "Suttor" River, on the 30th October, in latitude $20^{\circ} 36'$, longitude $146^{\circ} 50'$, I followed up the latter river, soon encountering dense brigalow scrubs, which gradually extended over the whole face of the country, and impeded our progress considerably.

40. In about latitude $21^{\circ} 30'$, longitude $146^{\circ} 40'$, the Suttor is joined by the "Belyando" of Sir T. Mitchell. This river was running, there having been heavy rains on the upper part of its course.

41. Availing myself of this favourable circumstance, I followed it up to latitude 22° , and then steered S.E. in hopes of finding a more open country, but after crossing a low ridge of sandstone hills, entered a vast level plain, covered with brigalow scrub, which continued to latitude $22^{\circ} 40'$, longitude $147^{\circ} 10'$, where we crossed a range of scrubby mountains, and descended to "Peak Downs" on the 12th November.

42. Peak Downs, as seen from the western range, extended N.W. and S.E. for about 60 miles, with a breadth exceeding 30 miles, consisting of gently undulating plains of rich black soil, well grassed. These plains are separated by belts of thick scrub; the prevailing rock, basalt and limestone. The absence of the surface water will, however, prove a serious drawback to this otherwise fine tract of country.

43. This scarcity of water obliged the party to skirt the S.W. limit of the open country, and much brigalow scrub was encountered.

44. On the 15th November reached the left bank of the "MacKenzie" River, about 15 miles above its junction with "Comet" River.

45. Being nearly on the latitude of Port Curtis, I steered an easterly course through a succession of dense scrubs, and on the 22nd November reached Messrs. Fitz and Connor's station on the Dawson River, where we experienced a most hospitable reception.

46. It now only remained for me to connect the route of the expedition with some known point on the surveys of the district, and I proceeded to Mr. Hay's station, near which the Crown lands commissioner of the district was encamped; but as the duties of this department have little reference to the geographical features of the country, the position of the stations could not be ascertained. Mr. Wiseman, however, afforded me all the information in his power, and I consequently proceeded fifty miles by the road to Gladstone to obtain bearings to Mount Larcom and other hills near Port Curtis. The party travelled by the road through the Burnett District, and reached Brisbane on the 16th December, 1856.

47. Extreme monotony characterises the physical features of the whole country travelled by the Expedition from the Victoria to the 140th meridian, the interior appearing to consist of a table land of sandstone formation, averaging 800 feet above the sea level, along the edge of which small rivers take their rise, and traverse the short space which intervenes between the table land and the ocean.

48. This table land appears to form the continuation of the interior desert which exists to the south of the Victoria, the geological structure being the same, though from its greater proximity to the coast, on the line traversed, causing a less arid climate, the soil supports a greater amount of vegetation, and, consequently, it did not exhibit those remarkable ridges of drifting sand which characterise the more inland portions.

49. It was this inhospitable region, destitute of the requisites for the support of the party, which compelled the expedition to deviate so much towards the coast, and by following the northern slope take

advantage of the watercourses which there take their rise, and originate the numerous small rivers crossed by Dr. Leichhardt in his journey along the coast of the Gulf of Carpentaria.

50. I was desirous, had the nature of the country justified the attempt, of taking a more inland course than that traversed; but the absence of tributaries on the easterly side of the upper valley of the Victoria had warned me that the country in that direction was impracticable at the period of the year, as the wet season had terminated before the return from the exploration of the interior.

51. The route of the expedition was perhaps that which will tend more to develop the physical character of the northern portion of the continent, as the distance to which the rivers extend from the coast has now been approximately ascertained, and as none of the watercourses could extend any considerable distance into the interior beyond the line traversed by the party.

52. The insignificant size of the watercourses crossed between the Victoria and Albert Rivers is almost a proof that no country available for the purposes of settlement, exists to the south of the line traversed, while the small quantity of available land seen to the north, and the unfavourable account given by Leichhardt of the parallel line on which he travelled near the coast, render it improbable that any considerable tract of land suitable for settlement exists on the S.W. shore of the Gulf of Carpentaria.

53. On the western shores of the Gulf, the extensive development of basaltic rocks results in the formation of a fine tract of pastoral country, in which the upper river takes its rise.

54. The "Plains of Promise," which occupy the south shore of the Gulf between the meridians of 139° and 141° , extend little beyond latitude $18^{\circ} 10'$, south of which we always met with miserable sandstone ridges, except on the banks of the Flinders and Leichhardt Rivers, and the whole of these plains seem to result from the gradual recession of the waters of the Gulf. The grass was generally inferior, both in quantity and quality, to that on the Victoria or the eastern coast. Water is scarce during the dry season, and the surface is so level that it is excessively wet and boggy during the rains.

55. Had the vessel reached the Albert in time to co-operate with the land party, my intention was to have explored the courses of the Leichhardt and Flinders Rivers, which are now the only rivers in Northern Australia, the sources of which have not been ascertained, though from their size there is reason to think that they do not extend more than 100, or at the most 150 miles from their mouths.

56. East of the Gulf, after receding 30 miles from its shores, the

level country is covered with worthless scrubs of melaleuca, and triodia covers the more open country. Even along the course of the Gilbert, the extent of available country is by no means great.

57. Crossing from the western to the eastern waters, a marked change was observed, after travelling over nearly 13° of longitude in a country where the same geological and physical characters were almost constant. The sandstones were completely superseded by slates and primary rocks, climate and vegetation seemed to change in the space of a few miles, and it was only where wide spread plains of basaltic lava, with their peculiar vegetation, occurred, that any semblance of the western country remained.

58. Although large tracts of inferior country exist on the upper portion of the Burdekin, yet there are many fine patches of country well adapted for stock, while the never-failing supply of water in its channel, the hilly and varying character of the district, by protecting it from the serious consequences which attend long droughts in more level portions of Australia, will render it eventually one of the important districts of the colony.

59. South of the Burdekin we encountered the first brigalow scrub, which formed a broad belt, widening as it receded from the coast, and it separates the fine country just referred to, from the valleys of the Mackenzie, and other tributaries of the FitzRoy River.

60. So large an extent of this latter district has already been tendered for as stock runs, and reported upon by the Commissioner of Crown Lands, that it would be useless for me to attempt a further description, which would necessarily be imperfect.

61. With reference to the capabilities for settlement, the portion of Australia traversed by the expedition may be divided into three sections, each with its distinct character, climate, and geographical position, viz., the N.W. Coast, the Gulf of Carpentaria, and the Eastern Coast.

62. The first of these offers considerable facilities, the Victoria giving access to the interior; the navigation is by no means difficult, if due precaution be observed. That the country is suited for stock, is shown by the excellent condition of our horses and sheep, which recovered rapidly from a state of extreme exhaustion, consequent on the protracted sea voyage, while there is reason to believe that large tracts of good country extend as far to the S.W. as the FitzRoy, beyond which the desert appears to come down to the coast.

63. Considering its position within the tropic, it is well watered by the rivers; and though the climate is extremely hot during three

months of the year, the dryness of the atmosphere seems to counteract that unhealthiness which is usually inseparable from these latitudes.

64. The country around the Gulf does not offer any great inducement to the settler, being devoid of good harbours; the rivers are only accessible for small vessels, while the available country bears but small proportion to that which is utterly worthless. Its relative position causes its climate to participate in some degree with that of the Australian interior, and appears to be subject to drought.

65. On the eastern coast a large proportion of good country exists along the course of the Burdekin River and its tributaries. It forms a continuation of the tract which extends north from Moreton Bay, over which the stations are extending with such rapidity, that a few years will probably suffice for the settlement of the country to latitude 18° .

66. Judging from the character of the vegetation, the climate of this part of Australia is cooler and more humid than that of the Gulf or N.W. Coast; the rainy season is not confined to any particular period of the year, being situated between the intertropical and extratropical climates, the wet season of the former occurring from November to March, and the latter from May to September.

67. With reference to the aborigines of Northern Australia, I have been able to collect little information. Except in the immediate vicinity of the sea coast at the mouth of the Victoria, and on the southern shores of the Gulf of Carpentaria, their numbers are apparently small, though the recent traces in every part of the country visited, showed them to be diffused over the whole, and small parties were often seen.

68. Except on the few occasions detailed in the journal, our interviews were of a friendly nature, though twenty-six years' constant intercourse with the aboriginal Australians has convinced me how little their professions are to be relied on; and I therefore never relaxed those precautionary measures which, though they somewhat interfered with the collection of information regarding their habits and customs, has, with one exception, enabled us to avoid collision in which life had been unavoidably sacrificed.

69. In no part did I observe any marked difference in race or form of weapons from the aborigines of the western coast, except such variations in the latter as were requisite from the difference of the materials from which they were constructed. The language differed from either that of Moreton Bay or Western Australia. Circumcision, and the removal of the front teeth, are practised by some of the tribes, but others did not practise either rite.

70. Circumstances over which I had no control compelled me to impose many duties on the scientific officers of the expedition, which, of course, greatly circumscribed their opportunities for collecting specimens and notes relative to the departments specially in charge. A large collection had, however, been made before I left the Victoria, to which the unabated zeal of Mr. Elsey and Dr. Mueller has enabled them to make many valuable additions during the last journey; and it gives me pleasure to record my thanks to those gentlemen, and also to Mr. H. Gregory (to whose unwearied care and judgment in conducting the transport service of the expedition, the extraordinary rapidity and success of the several journeys are mainly attributable), for the cheerful assistance and support they afforded me in carrying out the objects of the expedition. To Mr. Baines I am also particularly indebted, and can only regret that I have been compelled to detain him on service which, while it almost precludes his devoting his time to his artistic pursuits, imposes duties of a peculiarly harassing nature.

71. I would also bring under his Excellency's favourable notice the excellent conduct of Charles Dean, Robert Bowman, and John Melville, who accompanied me from the Victoria to Moreton Bay, and whose constant attention to their several duties, and cheerfulness under privations of no ordinary nature, merit the highest commendation.

72. I am now preparing a map of the route of the expedition from the Victoria River towards Moreton Bay, and will transmit the same on its completion.

73. All the documents relative to the expedition, previous to the 21st June last, are now on board the *Messenger*, which vessel was employed on the service of the expedition after the *Tom Tough* became unfit for further service; and I daily expect her arrival in Sydney, with the remainder of the party in charge of Mr. Baines.

I have the honour to be, Sir,

Your obedient servant,

A. C. GREGORY,

Commanding N. A. Expedition.

*The Honourable the Colonial Secretary,
&c., &c., &c., Sydney.*

MR. J. R. ELSEY, F.R.G.S., surgeon to the North Australian expedition, made a few remarks on some of the physical features of the country traversed by the expedition. He brought forward a short report which he had furnished to Mr. Gregory, of the climate of the country, and its sanitary effect upon the party. He hoped before the next meeting of the Society to have corrected and completed a meteorological journal kept by him at the Victoria River, during

nine months, which was at present, with other more detailed notes, on board the Messenger.

The PRESIDENT asked whether it was discovered that the Newcastle range divided the waters that fell into the Gulf of Carpentaria from those that flowed into the ocean?

MR. ELSEY replied that the Newcastle range did not divide them. It was a peculiar feature of the range that the Gilbert river ran through it.

The PRESIDENT said the Meeting would agree with him that the exploration of Mr. Gregory and his associates had been one of the most remarkable ever undertaken by the explorers of Australia. The Society had already honoured the chief of the expedition with their Gold Medal; and he was sure, from what had fallen from Mr. Elsey, that a whole evening might still be profitably devoted to the consideration of the subject.

The third Paper read was—

3. *On the Structure of North-Western Australia.* By WM. H. FITTON, Esq.,
M.D., F.R.G.S., &c.

Addressed to Sir RODERICK I. MURCHISON.

HAVING undertaken so long ago as in 1825 to examine and describe some specimens brought from the coast of Australia by Captain Philip Parker King, R.N., I ascertained the disposition of the strata on the part of the north-western coast which that officer has described; and finding in Captain Flinders, an account of the chains of islands, where he closed one division of his survey, I was led to connect his observations at the N.W. of the Gulf of Carpentaria with what I had learned from Captain King—the distance between the two stations and the extreme points of this region being not less than 18° of longitude,—about 1250 English miles.

The following is an extract from Captain Flinders's description of a part of the N.W. coast:*

“A third chain of islands commences here, which, like Bromby's and the English Company's Islands, extends out north-eastward from the coast. I have frequently observed a great similarity, both in the ground plans and elevations of hills and of islands, in the vicinity of each other; but do not recollect another instance of such a likeness in the arrangements of clusters of islands. This third chain is doubtless what is marked in the Dutch chart as one long island, and in some charts is called ‘Wessel's Eylandt,’ which name I retain, with a slight modification, calling them *Wessel's Islands*. They had been seen from the N. end of Cotton's Island to reach as far as thirty miles out from the main coast; but this is not more than half their extent, if the Dutch chart be at all correct.”

These observations from a geographer of such talents and experience as Captain Flinders, coinciding with what I had learned from the maps and specimens of Captain King, led me to the speculations

* Flinders's ‘Voyage to Terra Australis (vol. ii. p. 24), prosecuted in the years 1801 to 1803’—with an Atlas. London. Two vols. 4to. Not published till 1814.

given in the paper, which form a part of the Appendix to the voyage of Captain King,* and which have been confirmed by more recent observation; so that it is now ascertained as matter of fact that the whole of the N.W. coast, from the Gulf of Carpentaria to the scene of Captain King's observations, and those of the French voyages on the W.,—may be regarded as one great deposit of ancient sandstone, extending to more than 14° of longitude (about 973 English miles), and forming, apparently, a great natural division of the country.

This view, which is given as a speculation in the Appendix to Captain King's work, published in 1825, has been confirmed by the more recent observations of Leichhardt,† and especially by the valuable discoveries of Captain Stokes in the years 1837 to 1840.‡ It is further confirmed by the observations obtained during a recent expedition of Mr. Gregory, of which an account has been published in the *Geographical Journal*, and a sketch given in Arrowsmith's map of 1856;—and by the tracings of Mr. Wilson, the geologist connected with that expedition, which represent several remarkable ranges of sandstone, named Stokes, Newcastle, Ellesmere, and Murchison Ranges; all of them according in direction and composition with what was to have been expected.

A copy of Arrowsmith's map, which I now send, with lines rudely marked upon it, will sufficiently explain these views; representing first, the remarkable ranges on the N.W. coast, described by Captain Flinders; secondly, the course of Leichhardt's journey, which exhibits two portions—first, a line parallel to the coast at the bottom of the Gulf of Carpentaria, and, secondly, a continuation, nearly in the same direction, of streams connecting that gulf with Van Diemen Gulf, and passing through a remarkable group of mountains, which form what is called in the map a high table-land, 3000 or 4000 feet high; thirdly, a portion of Victoria River, discovered by Captain Stokes; and fourthly, the remarkable group of islands, extending from Dampier Land to Cape Londonderry, and exhibiting numerous instances of the peculiar form resulting from the summit of trap-rocks, described by Captain Stokes and represented by Captain King,—with long straight fissures, of which Prince Regent River is a remarkable example.§

* 'Narrative of a Survey of the Inter-tropical and Western Coasts of Australia.' Two vols. London: 1826. Appendix, vol. ii. pp. 556 and 600.

† 'Journal of an Overland Expedition in Australia from Moreton Bay to Port Essington,'—a distance of upwards of 300 miles. 1844 to 1845. London: 1847.

‡ 'Discoveries in Australia, with an Account of the Coast and Rivers explored and surveyed during the Voyages of H.M.S. Beagle, in the years 1837 to 1842.' By John Lort Stokes, Capt. R.N. Two vols. London, 1846.

§ See the Plate, given by Captain King, of a portion of strata, consisting of reddish sandstone, on Prince Regent River. Vol. ii. p. 40.

It may be remarked that the general outline of the island of Timor, at the distance of about 250 miles, is nearly parallel to the direction of the strata in this portion of Australia.* And, perhaps, it may not be carrying speculation too far to observe that the lines of direction of the strata, in several points in the northern hemisphere, nearly coincide with that above mentioned, the predominant ranges in North America and in England having a direction nearly from N.E. to S.W.

The points of resemblance of a large portion of the S.W. of this part of Australia to the old red sandstone (Devonian) of England, are obvious; and the analogy is increased by the trappean rocks, which, in many instances, are found, especially on the N.W. coast, capping, or alternating with, red sandrock; but no fossils have yet come to my hands.

The relations of the sandstone in the S. of Australia, and in Van Diemen Land, are now interesting subjects for inquiry.

The PRESIDENT pointed out the value of this memoir to geologists, and warmly commended the speculations of his old and eminent friend Dr. Fitton.

The fourth Paper read was—

4. *Notes relative to the late proposed Expedition to discover the Sources of the White Nile.* By MR. A. W. TWYFORD.

THIS expedition was organised in the autumn of last year, through the direction of the Pasha of Egypt, by M. le Comte d'Escayrac de Lauture, who, in accordance with the wishes of the Pasha, collected for the purpose twelve gentlemen from different European countries. Through the kind introduction I received from your Secretary, Dr. Shaw, to the Count d'Escayrac, I had the honour of receiving one of the appointments with a view of assisting in navigating the boats up the Nile.

As communications respecting the objects of the expedition have already been made to the Society by Count d'Escayrac, I feel it only necessary under the circumstances to explain what part I myself took in the expedition. As every one knows the route from Marseilles to Cairo, I will not dwell upon that part of my trip, but at once begin by stating that we arrived at Cairo on the 27th of September, 1856, and after consuming a good deal of time, through want of preparation before my arrival, I managed to start with the

* The line which includes the great volcanoes of Symbaua has a direction nearly from east to west, making a considerable angle with that of Australia, &c., a change not impossibly connected with volcanic action. I find in Mrs. Somerville's *Physical Geography* that the line of direction of Wessel and the other islands is continued in New Guinea, but the authority is not mentioned.

boats on the 19th of the following month; it having been arranged at Cairo, that with M. Pouchet the doctor, and Mr. Clague the photographer, I should proceed with my flotilla to Berber, up the river, there to be joined by M. d'Escayrac de Lauture and the rest of the party.

Under instructions from the Government I had collected at Cairo one steamer of 30 horse-power, one of 15, and four of the large-sized country boats heavily laden with waggons, which were considered necessary for the expedition, with four ordinary ship-boats.

I was furnished with a guard of sixty soldiers and sailors, and invested with the command of this—the nautical—part of the expedition.

Having left Cairo on the 19th of October, 1856, we were towed by two large steamers as far as the first cataract, where we arrived on the 31st of same month.

As so many country boats now pass over this cataract every year, the difficulty is greatly diminished as regards that sort of craft, but, as far as steamers are concerned, it is very different, for with the exception, I believe, of the two steamers that conveyed Mahomet Ali and his suite to Korosko, about the year 1820, the steamer under my charge is the only one that has been carried over.* The chief difficulties I encountered here arose from the dislike that the sailors had to pass over the cataracts in the steamers, and the terror with which the natives viewed the proceeding altogether.

Nothing short of my immediate presence in each boat, as it went over, would induce any of them to work at all. It took about a day to pass each boat over, having frequently upwards of 600 men all pulling or pretending to pull at once. It was entirely owing to my being there too late in the year that I failed in getting the large steamer over, for I am persuaded that it would be comparatively easy to pass any vessel, not drawing more than 10 feet of water, over the first cataract in the months of July and August. For this reason we left the largest steamer behind, as when once the Nile has commenced falling it does so with amazing rapidity.

The first cataract is nothing more than a very narrow and shallow succession of channels, through which the water pours with great rapidity at the rate of 6 or 8 miles an hour. About 3 miles from

* With reference to a paragraph that appeared in 'The Papers' that I had lost one of the steamers under my charge in ascending the first cataract, I beg to state that this assertion was incorrect. The facts of the case were these:—Finding I was not able to get my second (the largest of the two) steamer up the cataract, I left it at Assouan; but a steamer belonging to the Pasha, that was at Assouan at the same time, was lost in an attempt to ascend the cataract, which probably led to the above mistake.

Assouan I came to the first ridge of rocks, which stretches, with the exception of a very narrow channel, right across the river. The water pours through this channel at great speed, but the engines were powerful, and we got through in safety. From Assouan up to this part of the cataract there were 10 to 20 feet of water. After getting over this, you go through quiet waters for about three-quarters of a mile or so, when you come to the second ridge, which is a repetition of the first, with the exception that the higher you go the greater is the difficulty, as the water then runs with greater rapidity and the channel becomes more shallow. The steamer passed through the second rapid; but on coming to the third, the engines were not able to hold their own, and began to go astern, on seeing which there was a universal yell set up by the rais or boat-swain of the cataracts and his men—as they were told that if anything happened to the boats they would have their heads cut off by Saïd Pasha, the Viceroy. Overboard they all went, and in a few minutes we had about 800 men pulling away on the ropes, and after an immense struggle with the water, we passed over. Another ten minutes brought us to a corner round which the water ran more rapid than ever. Here we again went astern, although the engines were going at full power. Here the steamer struck on the rocks, and although the boat had no hole made in her, I was in momentary fear of losing the screw or the rudder. The Governor of Assouan and his numerous attendants got into a fright here, and began to count their beads. The women and children were driven out of the neighbouring hovels and made to catch hold of the ropes, and at last we succeeded in hauling the steamer off.

We next reached the fourth ridge, where the steamer struck violently on the rocks.* She was then on the west side of the channel, but we got her off again and tried her in the middle channel, and there she struck again, and continued bumping violently. I then saw that it was quite impossible to get her over the rapids, and after taking counsel with the Governor, I determined to take her back to Assouan, at which place we arrived in the evening.

The following day I went over the cataracts with the rais, and got capsized out of my boat; but I am of opinion that the large steamer might have been taken over if I had received proper assistance.

On the following day I determined to make another attempt with the steamer over the cataracts, but as the rais refused to lend me assistance I was obliged to give up the attempt.

On Wednesday, 12th of November, I got my last boat over the

* This Channel, after December, is quite dry.

cataracts, and on Thursday the 13th started at daylight with all the boats before me. About 8 A.M. came to a village named "Kouloutout," where two of the rais or pilots had their country-houses of mud, and where at their request I stopped for ten minutes to allow them to get some food that their families had prepared for them. The whole population ran out to say "Good bye" to their relations, crying bitterly; for they all thought that we would never return.

The wife of one of the pilots made her appearance with a sheep as a present to me. As long as the villagers could walk along the shore they kept the boats in company, wailing and screaming fearfully; and when the shore came to an abrupt termination, they all set to work throwing water at us for good luck.

The morning that the first of my boats tried to get over, the rais of the cataracts sacrificed a sheep to some saint's tomb or another, to persuade him to get the boats over safely; and when the steamer struck on the rocks, he swore by Mahomed that he would never waste another sheep. One of my cawasses also told my interpreter that as he had to go over the cataracts next day, he had sacrificed a sheep the night before.

On Sunday the 23rd we reached the village of Wadi Halfeh. As soon as possible I went up to the foot of the second cataract in the steamer, and we then took to a little cutter and went over the cataracts. These deserve the name of cataracts, though the first do not.

There are two channels, one easier than the other, both passable at high Nile; but I arrived too late for the easy and safe passage, and had to wait until the large passage became passable. The water rushes through with the greatest violence, and there is a 2 or 3 feet fall.

The cataracts are a succession of rapids, each one as you ascend being worse than the former.

I took the effendi and the sheik of the village with me in the cutter, who were both in a great fright. They had neither of them been over the cataracts, and never would have gone of their own free will. The cataracts do not present such a fine view to the eye as one would expect, but they are much more extensive and more dangerous than the cataracts at Assouan.

No one can conceive the rapidity with which the water pours down. For instance, it took me, in a small boat pulled by ropes and fifty men, eight hours to ascend, and one to come down; and in ascending one rapid, it was as much as I could do to sit still without going head over heels into the water, the boat's bow was so much above the stern.

Monday, 24th November.—From the date of my arrival at Wadi Halfeh till my departure, it blew a strong gale from the N.W. and was very cold.*

I was 16 days in passing the steamer and dahabiahs (boats) over these cataracts, during which time I kept 3500 men fully employed. Some of the men I took from Assouan and the villages as I came along, and the rest were sent all the way from Dongola.

The cataracts are 12 miles in length by 3, and are interspersed with rocks and islands,† some a mile in length, and the channels alter according to the time of year at which boats happen to arrive. In some places I found a fall of water of 3 or 4 feet, and in others the rapids had to be passed over a straight piece of water of 300 or 400 yards.

On the morning of the 15th of December, after great difficulty and contention with the natives, and much anxiety on my part, we got clear of the Wadi Halfeh or cataract, and on the following morning started early for Dongola. On our way we found four more cataracts: the names of these are Ambercole, Tangúr, Dal, and Hannek. After having with difficulty surmounted them, we proceeded up the river and arrived at Dongola on Sunday the 4th of January, 1857. Here I waited a fortnight to repair the boats.

On the morning of the 28th I started towards Meroe, or the fourth cataract; and on reaching the village of Ambercole received a letter from his Highness the Viceroy, informing me that the expedition was broken up, and ordering me to return, but to wait for him at the village of Abdúm, where he would join me in a few days from Khartum.

On Friday, 6th of February, the Pasha with his suite and troops arrived, and we all returned to Dongola. I was then informed of the particulars which led to the breaking up of the expedition, and received orders to return overland to Cairo, at which place I arrived, after a very fatiguing journey, on Sunday the 19th of April.

I cannot submit these few hurried notes without making a few concluding remarks. When I accepted my appointment from the Count d'Escayrac, I was not aware that I should have held the responsible situation I did. A French naval officer was to have had the command of the boats; but as he did not make his appearance in time, I was obliged to take his place. I was determined, however, not to shrink from the responsibility—the pride of being the only Englishman in the expedition, the confidence I had in my own

* The meteorological and other observations I made, I will take another opportunity of communicating to the Royal Geographical Society.

† These islands are barren, though at high Nile they are mostly under water.

determination to do my best, and the hope of distinguishing myself, bore me up. I very much regretted that boats especially adapted for the purpose had not been built in England. If this had been done, the great and almost insurmountable difficulties I sustained at Wadi Halfeh would have been in a great measure obviated; and had I left Cairo at the proper season I should have experienced much less trouble altogether. When I heard that this expedition was abandoned, it was a great source of satisfaction to me to know that my conduct had been appreciated by the Royal Geographical Society.

The PRESIDENT said, they must all feel proud of the prowess of their young countryman. He must remind them that M. d'Escayrac, the head of the expedition, was the author of a valuable work on the geography of Sudan, and he only regretted that the dissensions which had broken out in his camp, had prevented him from joining Mr. Twyford at the cataracts of the Upper Nile, and thus carrying the expedition towards its ultimate destination.

The fifth Paper read was—

5. *Report of the Expedition for the Exploration of the Rewa River and its Tributaries, Na tite Levié, Fiji Islands.* By Dr. MACDONALD, R.N.

Communicated by the ADMIRALTY.

[This Paper will be published in full in the next Journal.]

The sixth Paper read was—

6. *Report on the Specific Gravity of the Sea-Water on the West Coast of Africa.* By HENRY M. WITT, F.C.S.

Royal College of Chemistry, April 17, 1857.

SIR,—The samples of sea-water collected on the western coast of Africa by Dr. Campbell, and placed in my hands by you, were, I regret to say, far too small to admit of chemical analysis.

The colour which the sea had acquired by the influx of a large river you mentioned as being peculiar, and were desirous of information as to the nature and amount of the colouring matter: all that I have been enabled to ascertain on the subject is, that it was evidently a suspended yellow substance which modified the usual green colour of the sea; this suspended matter had separated from the water in the samples submitted to me, and appeared curiously light and flocculent, so that it would suggest for itself a more or less organic origin; but its amount was really small, in some of the samples only just visible: so that to have made a chemical examination of it

in order to ascertain its real nature, or even to determine its relative proportion, would have required at least a gallon instead of one or two ounces of water.

In most cases, however, the samples were sufficient to enable me to determine the specific gravity, and these numbers may possess some little interest, as a further confirmation of the general observation of the diminution of the specific gravity of sea-water as it approaches the mouths of rivers.

The experiments were made after filtering off the suspended matter, so that all the samples were in the same clear state, and at the same temperature of 60° F.; and I may be allowed to mention that, although the differences may appear slight, they are, in fact, considerable, it being remembered that in every case about 1000 grains of water are used.

The samples were numbered as they approached the coast, commencing at the greatest distance from it, and their specific gravities are contained in the subjoined Table:—

Number of Sample.	Date when Collected.	Latitude.	Longitude.	Temp. of Water.	Temp. of Air.	Specific Gravity.
	1856.			Fahr.	Fahr.	
1	May 23 .	3° 17' S.	2° 25' E.	75° 0'	77°	1·027455
2	„ 24 .	3 17 S.	3 37 E.	75 0	77	1·027865
3	„ 25 .	3 26 S.	4 42 E.	74 5	76	1·027370
4	„ 26 .	3 27 S.	5 37 E.	75 0	76	1·027070
5	„ 27 .	3 45 S.	6 55 E.	77 0	77	(*)
6	„ 28 .	3 57 S.	8 25 E.	76 0	76	1·027000
7	„ 29 .	4 58 S.	8 27 E.	75 0	76	1·025200
8	„	..	..	75 0	74	(*)
9	No label.	..	..	..	..	(*)

(*) In these cases, there being less than 1000 grains, the specific gravity even could not be taken.

Hence it appears that the specific gravity of the open sea, unaffected by rivers, may be assumed to be about 1·02745 to 1·02785, unless at these furthest points it be still reduced by the same cause.

The following are some of the results of other observers:—MM. Adolphe and Hermann Schlagintweit* give 1·0277 as the mean specific gravity of the Atlantic, from the results of a series of experiments made on a voyage from Southampton to Bombay in 1854; and Rear-Admiral Philip King, R.N., F.R.S., gives a mean specific gravity for the—

Pacific, between 10° and 40° S. of 1·02648,
 „ „ 40° and 60° „ 1·02613,†

* Philosophical Transactions, January, 1855.

† Ibid., December, 1856.

so that it would appear probable that the Atlantic has a higher specific gravity than the Pacific, and it would be interesting to confirm this by further observations, or more correctly by actual determinations of the quantity of saline matter.

Of course the density of inland seas, as the Mediterranean, &c., is higher than that of the Atlantic or Pacific Oceans.

Although the fact of the diminution of the specific gravity of sea-water by the influx of large rivers is an observation which we should anticipate *à priori*, I find only two other recorded sets of experiments on the point. Mulder* states that the specific gravity of the Atlantic falls, in the North Sea, where several large rivers enter it, to 1·0255; and Dr. John Davy† found that at the mouth of the Demerara the density of the water was 1·0036, whilst that of the sea eighty miles distant was 1·0266; and my own experiments show a similar diminution, the sample taken nearest the Loando coast (*viz.* in long. 8° 27' E.) having a specific gravity of 1·02520, whilst in the long. 3° 37' E., or 4° 50' further from the coast, the specific gravity of the sea-water rose to 1·02786.

I have, &c.,

HENRY M. WITT, F.C.S., *Assistant Chemist.*

To Sir Roderick Impey Murchison, PRESIDENT R.G.S., &c., &c.

The PRESIDENT next announced the titles of other papers which, for want of time, had not yet been read.

He had also to call their attention to a series of remarkable water-colour sketches of the mountains of porphyry, basalt, and other igneous rocks in the interior of Asia, extending into China—countries of which they had hitherto possessed little knowledge. The explorer of this region, Mr. Atkinson, was present, and was about to produce a beautifully illustrated work which would throw new light upon the structure of the interior of Asia.

The President then gave some information respecting the expedition which was about to proceed to the Arctic regions under Captain M'Clintock. Great importance was attached to the acquisition of an interpreter, and they knew that an Esquimaux interpreter was not easily obtained. The Secretary had long ago been in correspondence with Captain Irminger, of the Danish navy, to procure the services of that excellent man Petersen, who had lived among the Esquimaux in Greenland a long time, and who had already served as interpreter with Penny and Kane. That person had arrived from Greenland at Copenhagen a few days ago, and intelligence of the fact having been received on Saturday, he (the President) had immediately telegraphed to Captain Irminger, requesting him to send off Petersen at once. He was happy to say that an answer had been received, stating that Petersen would be in London on Wednesday, and proceed on Thursday to Aberdeen. The expedition would sail immediately on his arrival.

In concluding the business of the meeting, and at the same time closing the session of 1856-57, the President said he was sure his associates would admit

* Poggendorf's *Annalen*, xxxix. 513.

† Edinburgh New Philosophical Journal, xlv. 43.

that there never had been a session of the Geographical Society more productive of valuable results than the one which had just transpired. Lastly, he had the pleasure to announce that having applied to the University of London, and to the Royal Society, for permission to assemble in their great room at Burlington House during the ensuing season, the request had been willingly conceded. They would thus have a spacious place of meeting, where ladies as well as gentlemen might assemble, without being exposed to the inconvenience which had been felt in their present small apartments.

The PRESIDENT then formally declared the Session to be closed.

ADDITIONAL NOTICES.

1. *A short Account of a Journey across the Rivers of British Kafraria, thence from the Great Kei to the Ghabaka River, with a Description and Sketches of Fossil Remains near the mouth of the Ghabaka.* By the Rev. FRANCIS FLEMING, M.A., F.R.G.S.

I LEFT King William Town at 5 A.M. on Monday, Nov. 21, 1853, and having heard of some gigantic fossil remains lying somewhere near the mouth of the Ghabaka, I determined to visit them, and likewise see something of the country lying near that river and the Bashee. Having but six days' leave, I consequently felt that I had undertaken no easy week's work, as these rivers rise about 150 miles to the N.E. of King William Town, and in the centre of Krel's Kafirs, among whom the rebel Hottentots had been dispersed. I put my full confidence, however, in the savage *honour* of the Kafirs, and determined to go nowhere without one, from whom I would first exact a promise to guide me safely. This I found to answer admirably, as during my trip I had on different occasions, and in different localities, six Kafir guides, who all fulfilled strictly their engagements with me, conducted me safely, prevented interruptions and inquiries from the Hottentots, and brought me back to the point whence we started. From the English traders who are located in that wild country I also received the greatest hospitality and aid, was everywhere received gladly, given the best of all they possessed, and procured the Kafir guides when I required them.

I travelled rapidly during the six days I was in the saddle. In the upper parts of the country there are of course no roads. I crossed the Great Kei river about 25 miles from its mouth, and found there that the Butterworth river is not the Coga, as laid down on some maps, but the Goa, which runs into the Great Kei about 20 miles from its mouth. The Coga is then the next river. East of this it runs near Butterworth, and falls into the sea at Mazeppa Bay.

The next river that I crossed was the Gwaninga, which runs nearly parallel to the Coga, about 20 miles N.E., and also empties itself into the sea. It is not more than 40 miles long from its source to its mouth. The Ixixini was the next. This is a larger river, and rises about 60 miles from the coast, in three sources, which join about half way down, and then flow into the ocean through one mouth, about 20 miles N.E. of the Gwaninga.

We next reached the Ghabaka. This is a much larger river than it is represented to be. It rises in the hills which formerly belonged to the great Kafir chief Hintza, who was slain in single combat by Sir Harry Smith. It has five distinct heads to the Little Ghabaka, and three to the Great Ghabaka. These flow into one course, each about 10 miles below the other: the first, which rises in the Great Ghabaka, about 85 miles from the coast; the smaller Ghabaka,

about 65 miles from it. These two rivers then flow on as distinct streams, and unite just at the mouth, which is wide and open, but intersected with sand-banks. This river meets the ocean about 20 miles N.E. of the Ixixini, and about 12 miles S. of the Bashee.

Crossing the Great Gnabaka, and passing along the coast towards the Bashee, about a hundred yards up is a small bay or estuary, surrounded by cliffs of red sandstone and oolite rock, in the faces of which I found the fossils imbedded. They appear to have been subject to the action of the surf at high tides, for they are much injured; in fact hardly any parts of the original animals seem left, but merely the indentation of where they have lain. They are, notwithstanding, wonderful in dimensions, and sufficiently distinct to show pretty plainly what they have been. So far as I could conclude from what I saw of them, as well as my very limited knowledge of geology, I at once determined them as gigantic sauroid reptiles of the oolite system,* but to classify them beyond this I could not dare. I consequently made drawings separately of each, as faithfully as I could, and with as much accuracy as to colour and form as time would allow me. The measurements I obtained by getting one of my Kafir guides to stand on the upper edge of the cliff and suspend a tape line 50 feet long, and the other Kafir to hold it tight at the base of the cliff, where the different fossil extremities intersected: the marks on the tape gave me the exact length, breadth, and dimensions.

I much regretted that my time was so limited; as it was, I remained there till dark, met with a fearful thunder-storm in the mountains on my return, and did not reach the traders' station, from which I had started in the morning, until half-past 11 at night, wet through and benumbed with cold. From this I started at daylight, and rode until half-past 8 in the evening, excepting two hours during the extreme heat of the day, when I offsaddled the horses.

In returning I took a different route, and inspected much of the country. In all directions it was most lovely and luxuriant. Limestone and ironstone were in many parts seen close to the surface, and the whole landscape was undulated into long ridges of fertile hills, and these again divided by longitudinal valleys. In no part of Kafirland have I seen more vegetation and fertility, and in saying this I am not unmindful that I have always ranked Kafiraria as the finest part of Southern Africa; if not indeed the most fertile and lovely locality in the known world.

I returned to Butterworth on Thursday night, and reaching the Kei, found, to my dismay, that recent rains in the mountains had brought down the torrent of this formidable river as a barrier to my farther progress. Trusting myself again, however, to my Kafir guides, I swam the river, and was nearly drowned. Thank God, I reached its furthest bank at length in safety, and after spending one more night under the canopy of heaven, I rose with the sun and reached my home at King William Town by 3 P.M. on Saturday.

* The dimensions of the largest one were as under:—

				Feet.	In.	
Length of the head	..	..	..	3	0	} Total length, 25 feet.
„ back	..	..	..	12	0	
„ tail	..	..	..	10	0	
Width of the head	..	..	..	2	0	
Length of front fins	..	..	..	2	4	
„ hind feet	..	..	..	3	0	

2. *On the Jolloffs of West Africa.* By Lieut. J. F. NAPIER HEWETT,
72nd Highlanders.

DURING my sojourn in the British colony of Bathurst, on the river Gambia, Western Africa, which is chiefly inhabited by Jolloffs, I enjoyed especially favourable opportunities of observing the manners and customs of this people, which so much interested me that I determined to make an excursion into their country.

With this intention I started from Fort Bullen, on the N. bank of the river, passed the town of Yassaou, situated in the district ceded to Britain by the King of Barra, and entering the adjacent country of Barra, inhabited by Mandingoes, travelled some miles until I arrived at a walled but ruined town (Whydah), which, having fallen under the displeasure of Demba Sego, the warlike king of the country, had been by him destroyed.

Soon afterwards I reached Berending, the capital, and the king having provided me with horses, accompanied by one of his sons, I crossed the border, and, passing several towns and villages, came to Bákándik.

Here I made another stage, and proceeding arrived at length in the Jolloff country, Saulaem, and shortly afterwards at Woikotaou, probably about midway between the French settlements at St. Louis, Senegal, and the British colony on the Gambia; but, as I possessed no instruments and took no observations, I can only speak from opinion, and am unable to assign the particular locality of any of the towns; and, as the vicissitudes of military life have caused the loss both of my journal and of the rough map I drew out, I cannot speak with much certainty; but the greater part of the paper now submitted was compiled on the spot from that journal.

The country bordering on the north bank of the river Senegal is inhabited by wandering Arabs, Moors of Ludamar, and within the inclosure between that river and the Gambia principally by a race of Mahomedan blacks, who speak an Arabic dialect. They are called Jolloffs; are one of the most powerful and extensive of the north-western tribes; and are a fine-looking, intelligent, handsome race of people, as unlike the American and West Indian negro of every-day life as the Englishman of the present age is like his forefather, the rude woad-stained Briton.

The features of the men of this race being devoid of the slightest trace of the negro cast of countenance, and being regular and well-formed, are very comely—so much so, that I have seen Jolloffs whose physiognomy, if white, or merely swarthy, instead of black, jet black, would be esteemed models of manly beauty.

They are all of tall, symmetrical stature, having a dignified, sedate presence, and do not possess the negro characteristics of large hands and unwieldy feet, but remarkably the reverse.

Their notable peculiarity is their hair, which appears to be of greater length than the wool of most negroes, and is twisted and tortured into little cylindrical ringlets about the thickness of three straws, and from five to six inches in length.

Hence it might be imagined they are Arabs, but, unlike that race, they live a settled life, dwell in established towns, cultivate lands, feed flocks, and engage in a regular system of traffic.

Taking into consideration their religion, the length of their hair, their other physical characteristics, and the similarity of these to those of the Arabs and the most stalwart tribes of the Hindostan peninsula, I am of opinion that the Jolloff race cannot be classed with the negro family, but pertain rather to the Caucasian, and must have sprung from an Arab horde that has abandoned a wandering life. Yet, in the first place, it must be remembered that the Jolloffs

are quite jet black ; and, secondly, I must premise that they have, as I believe, become Mahomedan comparatively lately ; but, be their origin what it may, they are negroes to all intents and purposes, and occupy a large tract of country.

The Jolloff country is divided into three or more independent kingdoms, which frequently war with one another ; and of which states the principal are Danaar or Senegal, Saulaem, and Ballagh or Baa. The chief towns of Danaar are Bowael and Kadjo ; of Saulaem, which lies to the southward of Danaar, Saulaem and Woioutaou, the latter about half way to Gambia ; and Ballagh or Baa, situated on the north bank of the river Gambia, but some distance up the stream.

Each kingdom is governed by a hereditary monarch, and each city by a hereditary magistrate or alcade, who is responsible to the king for the conduct of the townspeople, and accountable for the apprehension of all malefactors who may be supposed to have sought asylum within the walls.

The chiefs of Danaar and Saulaem maintain regular standing armies, and are, I believe, the only negro potentates who do so.

The King of Danaar is named Djumael, whose army, said to number 12,000, chiefly cavalry, is by no means to be despised, as the French at St. Louis, Senegal, and Goree tacitly acknowledge, by declining to accept the frequent challenges which Djumael offers, to quit their fortresses, marshal their forces on the plain, and measure their strength in fair fight with his army.

The religion, habits, laws, customs, country, towns, and pursuits of each and all of the Jolloff kingdoms being precisely the same, I speak not of the one particular kingdom I visited, but of the whole race and country.

The greater part of the expanse is perfectly flat—one vast sandy level, studded with groves of palms, stately trees, noble forests, tangled jungles, and intersected by sluggish creeks, whose swampy margin is overrun with the baleful, miasma-exhaling, but beautiful mangrove. The soil, though sandy, is very fertile, and, being generally cultivated, produces vast quantities of grain, and the ground-nut, which plant, putting forth its clove-like leaves after the rainy season, clothes the plain in a mantle of brightest emerald, and growing exactly like and about the height of clover, overrunning the ground and interlacing its sprays, makes the surface of the earth resemble a soft carpet. During the dry season the plain, with its vegetation yellowed by the burning sun, is of a rich golden hue, wearing the appearance of a landscape of chased gold, and the bright green and dense dark foliage of the trees contrasts beautifully with the brilliant tint of the expanse.

A remarkable feature is the number and size of the ant-hillocks, the tenements of the termites, which are conical, sometimes six feet in height, and so firmly constructed as to be almost capable of resisting the application of a pickaxe.

The principal trees I have noticed are the palm ; the towering silk-cotton-tree, whose trunk is like an inverted closed umbrella, and which would overshadow our most gigantic oak ; the ash-like mahogany ; the dense umbrageous caoutchouc ; the naked spectre-like monkey-bread ; the wild tamarind ; and a peculiar tree, and also bush which grows six feet in height, the extremities of the twigs of which appear at a distance to be on fire. This remarkable appearance in both is caused by their putting forth bright scarlet flowers at the end of each twig, while the bush itself is devoid of leaves.

The towns and villages are fenced round with a triple stockade, eight or ten feet high, made of the trunks and limbs of trees, planted perpendicularly, irregular at the crest, and therefore impracticable to escalate by ladders.

The streets are about three feet wide, having either side lined by mats, or bamboo hurdles, seven feet high, and, as the walls of the dwellings are but three or four feet high, the wayfarer sees nothing but roofs, which, being thatched, lofty, generally circular, and finished off at the apex with an orna-

ment, lend to the place the appearance of an extensive rickyard, until the traveller, arriving at a square, beholds the tenements unmasked.

The houses are built of clay burnt hard by the sun, and are very neat in aspect, and consist of a circular wall, built of mud, two to four feet high, pierced with ornamented loop-holes as windows, and a doorless entrance, the lintel of which is sometimes modelled into pillars, which last, like all primitive ornamental architecture, is imitative of the prevailing vegetable feature of the country, in this instance the palm. Within this inclosure is another and a higher circular wall, like a tower, having a lofty doorway, and the rafters for the roof are laid resting on this wall and on the lower one; these are thatched over, and then the hut is finished off as before described. The doorway of the inner chamber opens in the opposite direction to the low entrance, and this apartment, notwithstanding its utter want of ventilation, is that of the master and his favourite sultana, while the exterior gallery is the dormitory of the slaves, domestics, and children, and is also the kitchen, where in the evenings the fires are kindled against the inner wall, which is thus burnt like brick. Each house possesses a rectangular inclosed yard, in which is a shed having a mat on the ground, where the master performs his devotions and religious ablutions, and the sides of these inclosures form the previously-mentioned linings to the streets. I may here remark that each one of these huts is a small castle in itself, and is so admirably adapted for defence, that one man might evade his pursuer or defend it some time against numerous assailants.

The squares generally contain, besides other dwellings, the mosque; the school, over which a Marabou presides, expounding the Koran, teaching the youth, and preparing some of them for the priesthood; and the residence of the Marabou, where may be seen the Jolloff books, which consist of wooden tablets whitened and superscribed with Arabic characters.

The principal square is distinguished by a lofty tree in the centre, and is called the "penang" or market-place, and here the caravanseraï is situated, the horses and camels belonging to halted caravans picketed, palavers held, and, beneath the spreading branches of the tree, the women meet to dance, the men to hold festival, and the children assemble to celebrate certain Olympic games.

The granaries, wherein they deposit their ground-nuts, &c. are cane edifices erected on posts of palm-trunks, and the doors are merely bolted; while to the bolt is affixed a gree-gree or charm, which, the people being afraid to touch lest some mischief should befall them, serves as a lock.

The Jolloff cattle are very similar to the small short-horned Highland breed; but the sheep are the most remarkable animals, being long-legged, as tall as a small calf, marked piebald, yellow, brown, or black, and long-tailed. At first I mistook them for calves, and, as I said before, I do not recollect ever having seen them gathered in flocks. The horses are small, symmetrical, spirited, and tireless; but, being ridden with cruelly sharp bits, are not pleasant to the hand of an Englishman, and certainly are most incommodiously accoutred.

The Jolloffs are very superstitious, and are covered with amulets consisting of beads; pieces of cut, embossed, stamped, and enamelled leather, in number and beauty proportionate to the wearer's wealth; and snake-like necklaces of polished leather, in quantity and weight sufficient to bend the neck. The beads are either fancy beads or the Mahomedan rosary, and the others, amulets both decorative and useful, are called gree-grees. They consist of illuminated extracts from the Koran, enveloped in leather and beautifully ornamented—sometimes twenty on a string, and sometimes the whole Koran itself. These talismen are supposed to defend the bearer from certain terrestrial evils; to possess curative power; and even to ensure a passport to, and safe reception in Paradise.

These charms vary in value according to the price paid for them, and this

depends upon the degree of fame for sanctity the transcriber of the enclosed verse enjoys. Again, the value increases as the Marabou's sanctity increases; and *vice versâ*. The production of a youthful saint might only avail against rheumatism or lesser maladies; thus a man afflicted with that disease will so load the part affected as to impede the free use of the limb; and the little children rolling in the sand, though utterly naked, are laden with strings of cheap gree-grees, sometimes even crossed over the body like the belts of a soldier, protecting, as it is believed, the infant from the bites of insects, and lesser evils incidental to childhood. The people do not object to part with a gree-gree for a consideration; and the case, if opened, will be found to enclose a MS. exceedingly skilfully executed in illuminated Arabic characters. Prompted by curiosity, I uncased a crescent-shaped amulet. The exterior covering was of leather, very neatly sewn, enveloping a goat's horn, the orifice of which was sealed by what had been an aromatic composition; beneath which coating lay two pages (superscribed with texts from the Koran), yellow with time and worm-drilled—two pages of a printed English tract or sermon dated thirty years back! Little did the author and distributor anticipate the use to which the tract would be devoted.

The Jolloff religion is a mild form of Moslem, devoid of the intolerant bigotry that disgraces the creed of their neighbours the Moors of Ludamar; wherefore, few but the Marabous scruple to drink intoxicating liquors, and few entertain the orthodox animosity to Christians.

Notwithstanding the credulous superstition of the race, the Jolloff worship is pure Mahomedan, unsullied by any admixture of idolatry or paganism, but inculcating rigid observance of the various feasts, fasts, and ablutions, and proselytisation both by sword and by missionaries.

At Bathurst I met a Moor,—a bishop, I suppose,—who, surrounded by disciples, was on his travels, confirming and strengthening the faith of the wavering, and adding new converts to his religion. The Mahomedan religion consequently increases rapidly among the Kafir (infidel) tribes, while, from the comparatively attractive nature of that creed, few belonging to it are converted to Christianity—excepting the females, who, when dwelling in European colonies, and finding that in the Christian creed they enjoy equal rights with the men, are often converted.

The Jolloff is a musical race, possessing numerous musical instruments; and a synod of bards, which, I understand, confers degrees in music on the minstrels, one of whom, attached to the train of each eminent man, extols his patron's greatness, generosity, and deeds in arms, and, relating his pedigree, and eulogising each distinguished warrior who passes in review, stimulates the auditory to emulate the fame of those celebrated. The others are the historians of the country, who, roaming from place to place, from festival to funeral, celebrate whoever and whatever desired; reciting the history, martial achievements, and ancient traditions of the people; and, when occasion demands, inciting the populace, by heroic strains, to maintain the warlike renown of their sires.

Some of the airs are simple and pretty, others are wild and undistinguishable; and one of the most popular is almost the same as the Persian national air, which is called by the Hindoos "Taza-ba-Taza."

The males dress, as do the Arabs, in a loose toga-like garment of striped and coloured homespun cloth, and wear on their heads either an embroidered white cap, something similar to a Glengarry bonnet, or a turban formed of a white wrapper, which, in the evening and morning when the atmosphere is chilly, is worn like a plaid, and as a turban at midday, when the head requires protection from the burning sun. Their feet are shod with red sandals, the straps of which are neatly sewn and embroidered, and they are armed with swords and daggers encased in handsome red leather sheaths, stamped, em-

broidered, and enamelled; with spears of curious workmanship, and muskets. The chiefs possess robes of coloured cloth, embroidered with gold, and their everyday garments are well and tastefully embroidered with coloured cotton or silk.

They are armed with muskets, with curiously wrought spears, swords, and daggers; and their sandals, bridles, and saddles, are generally tastefully decorated. The pieces are procured from the French merchants at Senegal and the English of Gambia, the silk for embroidery from the Moors, and the iron weapons and leathern articles they either fashion themselves or procure from their neighbours the Mandingoes, a race peculiarly skilful in such work; in barter for gold and silver trinkets, in which the Jolloffs much delight, and which appear to constitute their chief wealth. These leathern articles are also given to the Jolloffs in payment for working rough gold, as in the goldsmith's trade they much excel; and the cunning with which they fashion the precious metals, even with their clumsy tools, is wonderful, almost rivalling the celebrated Maltese work in ingenuity and minuteness.

All business is conducted through the alcade of a town, who, on application being made, orders his men to procure whatever may be wanted; receives whatever payment he himself has fixed; discharges the claim of the artisan, and of course reserves a commission for himself. Regular trading caravans are received and dispatched to all quarters—to St. Louis and Mogador, to the Arabs, to the Mandingoes, westward and southward, and even to the banks of the Gambia. Owing, however, to the number of petty independent townships which, ever at war with one another, intercept and plunder these caravans laden with slaves, tobacco, baft, cloth, gold, and ivory, on the journey to or from a hostile tribe—less frequently to the last than to the other places—wars are too often declared on a frivolous pretext, either with the Mandingoes or with the Kafir (infidel) tribes, for the purpose of collecting slaves; but now that the slave-trade of the Senegal and Gambia rivers has been abolished, these raids are undertaken with the ultimate view of selling to the Moors the unfortunate prisoners captured. These predatory forays among the infidels have another object, viz., the conversion—in obedience to the injunctions of the Koran—by fire and sword, to the Moslem religion: thus, as interest is made to accord with duty, and those who fall in these crusades are preferred in Paradise above all others, the wars are frequent, and the tribes gathered to the fold of the “true believers” increase daily.

The Jolloff people are mild, hospitable, possessing no sanguinary laws; and, in hope of opening a trade, always welcome a “tobaubo,” or white man, towards whom, notwithstanding his creed—especially repugnant to Mussulmans—they are invariably gentle, accommodating, and inoffensive. A European may traverse their country in perfect safety, and even by himself, if he possess a knowledge of Arabic, and provides himself with a few colar-nuts for distribution; as the presentation and acceptance of a colar seals a friendly compact, the breach of which would be esteemed a crime of the blackest dye. The colar is a bitter pink kernel, brought from Sierra Leone. It is an excellent tonic, and is so preventive of thirst, that a Jolloff having one in his mouth will walk 30 miles without drinking water; and on this account, in a country where fresh water is only procurable at the city wells, the colar must be highly prized.

In conclusion: the recollection of the journey my mind now retains is that of galloping over an immense unenclosed plain, threading tangled jungles, and passing through dark forests; of seeing expanses of tall grass, eight or nine feet high, which seemed to bar the way, but when approached, a small opening, a dark green cave through which the path winds, would appear. I would dart in, the grass waved and whispered as it closed around me, and my knees brushed the stems, arched over my head and obscuring the sky from my view; but wild as was the scene, it is one of indescribable beauty, and having been once presented to the eye, has ever after an irresistible fascination and attraction.

3. *Result of DR. VOGEL'S Observations for Latitude and Longitude, January to August, 1855.*

Place.	Latitude.			Longitude.			Remarks.
	°	'	"	°	'	"	
Kuka	12	55	33 N.	13	24	00 E.	{The Latitude from Equal Altitudes.
Gujeba	11	32	00 N.	11	38	36 E.	
Gabbei	11	04	30 N.	11	21	15 E.	
Gombé	10	48	42 N.	10	20	55 E.	
Yakóba	10	20	10 N.	9	31	45 E.	
Muri	9	12	00 N.	10	32	33 E.	{This place is not so well determined in Longitude as the preceding.
Tindang	9	07	42 N.	10	52	44 E.	
Dalhaji	10	32	20 N.	8	23	08 E.	
Salía	11	04	46 N.	7	23	10 E.	
Bebeji (Kano) ..	11	35	30 N.	8	06	25 E.	

N.B.—The Latitudes are deduced from Observations “*off the Meridian*,” and are computed by Dr. Inman’s method of Cir-cum-Meridian Altitudes.

The Longitudes are from Meridian Distances, by one chronometer (Molyneaux, No. 3147). Judging from its uniform rate, it must have been very carefully attended to in travelling from place to place.

Kuka is assumed to be in Longitude $13^{\circ} 24' E.$, the other places measured from it.

October, 1857.

C. GEORGE, R.N.,
Map Department, R. G. S.

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PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.



VOL. II.

SESSION 1857-8.

Nos. I. to VI.

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NORTON SHAW.

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1857-8.

First Meeting, Monday, November 9th, 1857.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATION.—*Lieutenant-Colonel J. Temple West was officially admitted upon his election.*

ELECTIONS.—*Lieut. P. Blakiston, R.N. ; Lieut. B. Brine, R.E. ; Colonel H. Cartwright, Grenadier Guards ; Lieut. A. H. Gilmore, R.N. ; J. R. Elsey, M.R.C.S., late Surgeon of the North Australian Expedition ; Frederick S. and William H. Homfray, and Edwin Williams, Esqrs., were elected Fellows.*

ACCESSIONS.—The accessions to the Library and Map-Rooms, since the last meeting, were numerous and important, among which were Davis's China ; Jervis's Geological Map of the Crimea ; maps published by the Topographical and Statistical Dépôt of the War Department ; Observations, Magnetical and Meteorological, made at the Observatory at Toronto ; Maps of Bavaria, by the Bavarian Government ; Plans of Delhi, by the East India Company and Colonel James, R.E., F.R.G.S. ; French Charts, published by the Dépôt de la Marine ; the Admiralty Charts and Sailing Directions ; Map of the North-West part of Canada ; Portrait of Rear-Admiral Sir T. Beaufort ; Astronomical Observations made at the Radcliffe Observatory ; the Transactions of the Hakluyt Society ; Franklin Institute of Pennsylvania ; the Academies of Sciences of Paris, Vienna, Madrid, and Stockholm ; the German Oriental Society ; Darmstadt Geographical Society ; Geological Society of Dublin ; Society of Antiquaries ; the Royal, the Agricultural, the Astronomical, the Statistical, and the Geological Societies ; the Asiatic Societies of London, Paris, and Bengal ; the Madras Literary Society, &c. ; the Minutes of the Board of Education ; Coello's Maps of Spain, &c. &c.

The PRESIDENT said : Before we proceed to the regular business of the evening, I beg to congratulate you, gentlemen, on assembling at last in a place capable of receiving our members, who are now much too numerous to be

accommodated in our own meeting-room. The Senate of the University of London and the Royal Society have had the courtesy to permit us to meet here for the present Session, and I am glad to see that you are so conveniently seated. We have, therefore, to return our grateful thanks to those two bodies for having allowed the Royal Geographical Society to assemble in this fine building, now devoted to the advancement of science and letters.

But, while we assemble here, I would beg to remind you that the real business of the Society is carried on at our premises in Whitehall-Place, and, I hope, in a very effective manner. We have established there a Map-Office, which is found to be really useful to the nation. It is especially useful, I know, to Her Majesty's Government and to all the public offices. We have there a collection of maps of every portion of the world—maps difficult to be found elsewhere, and certainly such a collection as cannot be matched in any public institution in this metropolis; and during the recess we have rearranged our Library, so as to render it really useful. I need not tell you that we are in a very flourishing condition, after reading out the long list of names of new candidates; and I am proud to be the President of a Society that has been successful beyond all that its warmest friends could have anticipated.

Various papers of great interest have come in during the recess, upon Africa, Australia, and other distant regions, of which I will not now attempt to speak, but I feel certain that they will sustain the credit of the Society.

There is one painful subject, and only one, to which I must allude, with reference to our African explorations. I am sorry to say that the slight hopes I entertained of the life of poor Vogel, the adventurous young astronomer, who was making his observations with such fidelity in the interior of Africa, have been almost dispelled. With regard to Corporal Maguire, of the Royal Engineers, the news we have received through the Foreign Office is unfortunately but too authentic, and we learn that the poor fellow has fallen a victim to assassins. We have, however, the satisfaction of knowing that he died like a true British soldier, and that before he fell, he slew two out of the numerous assassins who beset him.

Respecting the different explorations now in progress, you will perhaps expect me, at the opening of the session, to make some allusion to the expedition in search of the lost Franklin Expedition. I closed my Anniversary Address with some observations upon that subject, which has long touched my heart so deeply. I have, as you know, for years entertained the hope that some more vestiges might be discovered of the relics of my illustrious friend. I am, therefore, rejoiced to announce that the expedition which was got up with so much alacrity, so much zeal, and so much devotion by Lady Franklin, is prospering to an extent which her best friends could wish. The accounts from Captain M'Clintock are exceedingly satisfactory, as conveyed in letters to Captain Collinson and Lady Franklin, in addition to the letter to Mr. Barrow, which has been published in the *Times* and other papers. I will not now read the letters in my hand, as they contain little beyond the chief features that have already appeared in print. It is well, however, to dwell upon the fact that our distinguished friend Captain M'Clintock has been furnished with all the provisions, sufficient coal, as well as with the requisite number of Esquimaux and dogs, that he sought for upon the coast, and that he has started with good hopes and bright prospects, and with perfect confidence on his part that he will discover some relics of the ill-fated expedition. It is cheering to dwell upon this feature of the expedition, and to remind you that the gallant commander is accompanied by that noble-spirited Captain Young, of the merchant-service, who, having contributed 500*l.* and his own services, writes, in a letter to Captain Collinson, "I will receive no pay if it is to come from Lady Franklin's resources; I will only receive it if Her Majesty's Government recognise our expedition."

Lastly, I come to the great geographical publication of the year. I hold in my hand the book which recounts the journeys and researches of my eminent friend Dr. Livingstone in Africa. This production marks an epoch in geographical science. Whether we look to the candour and honesty of the man, to his clear-sightedness as a traveller, to the firmness of purpose with which he executed those high resolves upon which he was bent, we cannot but be proud, as Englishmen, that he should have been carried through such difficulties as he encountered, and have produced such a work as this. Though the modest traveller has stated in his preface that he would rather travel over Africa again than write a book, his story is here put forth in so artless, so clear, and yet so telling a manner, that I venture to say Dr. Livingstone's style will be admired by many of those who might be supposed to become his critics. It is really refreshing to turn to these pages, and see how a traveller, who is bent only upon speaking the plain truth to Englishmen, wins your hearts, and how he so carries you with him as to give you a full conception of the African character. In congratulating you and all my countrymen upon the production of this remarkable work, let me congratulate Mr. Murray in particular in having had the good fortune to meet with such an author as Dr. Livingstone.

The PRESIDENT then took the Diploma of Corresponding Member, which he had signed, and, addressing Dr. Livingstone, said: In the presence of this company of your associates, I beg to present to you this Diploma of the Royal Geographical Society. I hope you will accept it as a testimony of our unfeigned and sincere admiration of your conduct, and of the respect which, as geographers, we shall ever entertain towards you for having realised that which no Englishman has ever accomplished—the traverse of the great continent of South Africa.

The Diploma was then presented to Dr. Livingstone, amid the acclamations of the members.

Dr. LIVINGSTONE: Really, Sir, I am in want of words to express my gratitude and thankfulness for the very kind manner in which you have referred to my labours. I beg to return my heartfelt thanks to you, as the President of the Society, for the remarks you have made, and to the Fellows for the kind manner in which they have received those remarks.

The Papers read were:—

1. *Additional Notes on the North Australian Expedition under Mr. A. C. Gregory.* By MR. THOMAS BAINES, F.R.G.S., Artist to the Expedition.

In the beginning of March 1855, through the recommendation of the Council of this Society, I was appointed Artist and Storekeeper to the North Australian Expedition, and joined Mr. Gregory, the commander, in Sydney on the 21st of May. As his reports have been read at previous meetings, it will only be necessary for me to notice briefly the leading points in the operations of the expedition up to the time that Mr. Gregory sent me with a detachment of the expedition in the Tom Tough schooner to procure fresh supplies from Timor.

The expedition consisted of a total of 18 persons and 50 horses, and on the 12th of August we sailed from Moreton Bay, taking the inner passage to Torres Strait. During this part of our voyage we

had fair breezes from the south and south-east, with smooth water; and though the necessity of anchoring at night, during the latter part of it, somewhat delayed us, we were inclined to think that the dangers of the outer passage would have more than counterbalanced this disadvantage. We saw four or five canoes at different times in the vicinity of Cape York: they were of single logs, hollowed out, and fitted with outriggers, also of wood and boat-shaped, to prevent their capsizing.

The natives seemed to unite the characteristics of the Australian and Papuan races. They were ornamented with regularly formed scars, which, being pulled open as they healed, allowed the new flesh to rise and form a prominence as thick as a man's finger. They had spears of hard wood, with pieces of bone, forming points and barbs, lashed on with strips of bark, and bows of bamboo with strings of the outer rind of the same, and arrows of wood or reed tipped with hard wood. These, as well as pieces of tortoise shell, they bartered for sticks of tobacco, handkerchiefs, &c.

The country here was covered with ant hills of red clay, twenty feet in height. We searched on Albany Island for the graves of those who perished on Kennedy's Expedition, but I believe none of our party saw them. I painted a record of our visit in black letters on a rock near the beach.

On the evening of September 2nd, the *Monarch*, which was leading at the time, ran upon a reef; and the schooner, which anchored near, grounded for two hours at low water. We found the barque on a flat bed of rock, the inequalities of which we picked away, to lessen the chance of injury to her keel, but were not able to get her off till Monday, the 10th. We obtained a little water from the well mentioned by Captain Stokes on Quail Island.

On Friday the 14th of September we anchored near Point Pearce, having seen nothing of the *Monarch* for the last three days; and on the 15th we ran up with the flood tide between the broad shoals in the estuary of the Victoria. At night we entered the river, and anchored in Blunder Bay, where, on Sunday the 16th, Mr. Gregory landed with a party to search for water, and found a rocky pool containing several hundred gallons. We sailed immediately, and, on Monday afternoon, again anchored near Point Pearce, where we found the *Monarch* landing the horses, which, for want of fresh water, could no longer be kept on board. We of course assisted; and though we had to swim them three miles, forty-one were safely landed, seven or eight having been drowned, one irrecoverably fixed in the mud, and another lost after he was brought ashore.

The sheep were transferred to the Tom Tough, and the Monarch being no longer required, sailed for Singapore. Mr. Gregory, with the party from the Monarch, proceeded over land with the horses, while we in the Tom Tough were to meet him at Kangaroo Point, up the Victoria.

Unfortunately, in running up with a light wind and strong tide, the schooner grounded, and drifting with successive tides from one shoal to another, remained on shore for twenty-seven days, losing an anchor and cable, straining herself so that sometimes it was feared she would go to pieces, and spoiling a great quantity of bread from the water, which at one time was four feet deep in her hold. The sheep, a hundred and forty in number, suffered greatly for want of water, and died daily. We made a trip to Palm Island, thirty or forty miles higher up the river, and brought down six hundred gallons in the inflatable canoe, and commenced boating the sheep up to a place in Long Reach, where we had found a well, and where Mr. J. R. Elsey with three men formed a camp.

Here, in October, Mr. Gregory arrived with thirty-six horses, four having been left behind from weakness or died from poison, and three more had been dangerously bitten by alligators near a small creek of the Fitz Maurice River. He went down with me in the boat to the schooner, and, landing a little lower down the river, found water oozing from under a stone below high water mark. We scooped out a well, and in the night filled two large casks, much to the astonishment of the crew, who could not understand our digging for fresh water underneath the salt. Our sheep were landed at a small pool, and when the schooner reached the place where the camp had been established, were brought up by the boats; the poor remnant of our flock comprising only a few miserable skeletons out of two hundred. I repaired the inflatable canoe, making two boats of it instead of a double one, as originally intended; and, on the 15th of November, Mr. Gregory, with Mr. Wilson, myself, and Flood, started for a day's trip up the river, which we found, like most of the Australian rivers, a chain of pools, perhaps a mile or two in length, with long portages between them. In the afternoon of the 17th we turned back, reaching camp the next day.

On the 23rd, Mr. Gregory, with his brother Henry, Mr. Wilson, and Dr. Mueller, left camp with seven horses, to make a preparatory exploration of the country. Captain Gourlay was busy with his own and our men in cutting timber, with which he laid a substantial inner frame in the Tom Tough, and I was left to see to the safety of the camp and horses. Two of these strayed to a consi-

derable distance, and taking with me Bowman, the best of our stock men, I went out for three days without success; but, on the next attempt, thinking they might probably have gone to the westward, where Captain Stokes had indicated the mouth of a creek entering the Victoria, I had the good fortune to find a large stream, where we were met by a tribe of natives, six of whom stood out in skirmishing order, with their spears poised upon their throwing-sticks; others stood in the rear as supports, and the rest remained in the bush close by. Our efforts to conciliate them were fruitless, and as in another minute they would have launched their spears, we charged them at full speed, revolver in hand. They fled immediately, and after chasing them a few hundred yards, we let them go, not thinking it necessary to fire on them. In the afternoon we found the horses, and next day reached camp, where we met Mr. Gregory, who had returned. Mr. Gregory now selected his brother, Dr. Mueller, Mr. Flood, myself, and four of the men, to accompany him on his next journey. We packed 30 horses, 27 of which carried on each side 50 lbs. of flour, sugar, or pork, with other things, making up the load to an average weight of 168 or 170 lbs., and left six for the alternate use of the party. The gunpowder was securely packed in half pound canisters in the centre of the flour bags. On the 1st of January, 1856, we started, but the horses being fresh and wild, took fright and rushed through a swamp, throwing off their packs, and losing about 100 lbs. of sugar. On the 3rd all damages were repaired, and we started again. The rivers were at this time so much swollen by the rains, that we had to pass a line over a tree in Jasper Creek and swing the whole of our packages, weighing upwards of a ton and a half, across it.

On the 13th we reached the large western branch of the Victoria, and travelling up this till the 22nd, we turned to the southward, and next day, with a small party, pushed forward to select a convenient spot for a dépôt. We found the land elevated to a height of 1160 feet, and consisting of extensive plains thinly overflowed with volcanic rock, which, forming good black soil, was covered with rich grass. Agate was plentiful, and out of this and the trap rock the blacks had been making vast numbers of spears and tomahawks, by striking one stone against another, something after the process adopted in making gun-flints. The ant hills had been excavated in search of larvæ and eggs; fresh water muscles had been fished up from the brooks; the trees had been notched by climbers in search of lizards, birds' nests, or honey; and holes in the ground appeared to have served as cooking places

for kangaroo or emeu flesh, which, wrapped in sheets of bark, was heated by several applications of hot stones.

On the 30th, Mr. Gregory, with his brother, Dr. Mueller and Dean, with eleven horses, started for the interior; and next day I selected a spot on Dépôt Creek, in 17° S., to form a camp, building a bark hut for myself and the stores, and another for the men, and marking a tree line to the spot where I had parted with Mr. Gregory, to guide him on his return to my camp.

On the 15th of March, and forty-fifth day of Mr. Gregory's absence, the blacks commenced burning the grass round us, but were driven off; and we were subsequently much annoyed by their attempts to encircle our horses with a line of fire, thinking probably that they were wild animals, and that of course they had a right to hunt them. I was obliged to ride out every day for the protection of our stud, and one day, after having been nearly surprised by the natives during our halt at noon, got near enough to send a bullet past them as a warning, which fortunately was understood, and our cattle were not again molested.

On the 27th Mr. Gregory returned, having traced the source of the Victoria, and found a river, which he named Sturt Creek, flowing toward the south-west, as far as $20^{\circ} 18'$ S., where it terminated in a salt lake. From its appearance he supposed it would be flooded once in three or four years, when of course it would enable a party to penetrate much farther into the desert. Taking with him his brother, myself, and Fahey, Mr. Gregory now rode to the eastward, and traced nearly all the tributaries of the Victoria. The country was mostly basaltic or trap plain, and Mr. Gregory calculated that he had seen three million acres of first-rate, well-watered pasture. While fording the main stream of the Victoria, Mr. Gregory's horse trod upon the back of an alligator, which was lying just below the surface; but the monster, alarmed at the interruption to his slumbers, shot straight away into deep water, without attempting to injure either the horse or his rider.

In another branch we found a dam with a narrow opening, near which the natives place a large basket to receive the fish as they drive them through. There were also several paintings in red, white, black, and yellow, on the rocks, some of them representing a snake with two horns and two fore-legs. Beside these, we found a great number of rough stone-walls roofed with sticks and grass, so as to form a kind of hut; but they were too small even for a man to sleep in, and did not appear to have been put to any use whatever.

We saw very few kangaroos or emeus, but sometimes shot a lizard,

a crane, or a few ducks or cockatoos, all which were accounted good feeding by the party; while the snakes, which were just as good, fell to the share of Fahey and myself.

On the 9th of May we reached the main camp, which Mr. Wilson had entrenched during our absence. The schooner had been taken down the river and laid on a bank to complete her repairs, but nearly all her crew were more or less disabled by scurvy, and the carpenter had died. A good understanding had subsisted between the party in camp and the natives, except on one occasion when, I believe, spears had been thrown and a shot fired, which had wounded one of them in the arm.

Our rations had hitherto consisted of flour and salt pork, the latter having been so wasted by the sun that ten 4 lb. pieces, when weighed, amounted only to 8 lbs., but, nevertheless, had to be issued at their nominal and not their real value. Mr. Gregory now took a 6 lb. tin of preserved beef, and, kneading as much flour into it, made biscuits, which proved so satisfactory that he worked up a large supply for the next journey.

I was mostly employed in the boats conveying surplus stores to the schooner, which was about 35 miles down the river; and landing opposite on one occasion to meet a party of natives, one of them, after selling spears to one of our men, took them out of the boat again; they also attempted to steal a tomahawk, but did not succeed, and one tried to pass his hand behind me and catch the arm with which I held my pistol. Another snatched the gun carried by Adams, but the sailor, being a powerful man, wrested it from him, and would have shot one of them, had he been permitted.

On Saturday, the 21st of June, Mr. Gregory, accompanied by his brother; the surgeon, Mr. Elsey; the botanist, Dr. Mueller; and three men, with thirty-four horses, seven of which were reserved for the saddle, left camp for the Gulf of Carpentaria, having ordered me to take charge of the remaining detachment, and proceed with the schooner to Coepang, in the island of Timor, for provisions. After this I was to meet him in the Gulf of Carpentaria, at the fork of the Albert River, just above the highest point reached by the boats of H.M.S. Beagle.

In passing down the river I observed an alligator on the Horse-shoe Flat, near Curiosity Peak; and going ashore with Mr. Humphery, the second overseer, we killed the animal, which was incapable of moving quickly on a level surface.

We took in water from Mr. Gregory's well, and wood from alongside, and the sailors gathered the fruit of the gouty-stem-tree,

the acid pulp of which, boiled up with sugar, greatly relieved the men, who were suffering from scurvy.

On Thursday, the 17th of July, we weighed and proceeded down the river, leaving a bottle with a letter, and a board with directions for finding it, on Entrance Island, as I had done already at the camp. On the 22nd we reached Point Pearce, and on the 25th we ran along the coast of Timor and worked into the bay of Coepang, where we anchored within half a mile of the beach opposite the town. The vessel had made but little water, and, as the sailors were still weak, I divided my own men into watches to work the pumps when necessary. The south coast of Timor seemed composed of mountains and rounded hills of moderate height, the latter covered with forest, and the lower slopes with cocoa-nut trees and other tropical vegetation. A small river runs from a gap in these toward the town; the water is fresh to within a hundred yards of the sea at low water, when there is hardly a foot of water on the bar, but vessels drawing six feet can enter with the tide. Fort Concordia stands at the mouth of the river, on a rock, apparently of old coral.

The Dutch resident, T. Van Capellen, was very kind to us; and though the master of the schooner had much difficulty in provisioning the vessel, I was in hopes that I could not only procure the supplies for the expedition, but assist him in those required for his crew, when the vessel was declared unfit to return east, and I had to run 600 miles to the westward to Surabaya, in Java—the strong south-east wind, which carried us thither, precluding all hope of our being able to work back again in less than six or eight weeks.

The Indian islands appeared very mountainous, and smoke was emitted from several volcanoes. Some of the hills in Java and Bali were 3000 or 4000 feet in height, but to the northward, as we passed through the narrowest part of the strait of Madura, towards Surabaya, the coast shelved down till it became an extensive flat, with broad mudbanks and shoals in the channel. The canoes and proas, under the immense triangular sails which their outriggers enable them to support, were very beautiful and picturesque, and I sketched several of them.

The town of Surabaya is situated on the Kedirie or Kaliemaas River, two miles from its mouth, opposite which the vessels lie, and passengers go up either in carriages or native boats, towed up by men walking on the bank.

The breaking of the Tom Tough's mainmast, while she was hove down for repairs, obliged me to discharge her, and having engaged a brigantine, the Messenger, on the 26th of August, every-

thing was transferred so quickly to her as to enable me to proceed to sea on the 30th.

To avoid the strong south-east wind and constant lee current on the south side of the islands, we kept to the north of them, where we found an eddy or counter current setting to the east with light variable winds, and by taking advantage of the land and sea breezes were able to make 20 or 30 miles a day.

With the purpose of keeping our water filled to the latest opportunity, and avoiding the consumption occasioned by a large quantity of live stock, I had given the captain leave to purchase provisions at Dielli, the chief of the Portuguese settlements on the north coast of Timor, where we arrived on the 1st of October, and about 3 P.M. anchored in a harbour almost perfectly enclosed by low coral reefs, the only other vessel there being a coasting schooner that had been 45 days in making the same passage as ourselves. We found the Portuguese Governor, Don Messada, very kind, and ready to dispense with any restriction that could cause delay. Here I purchased five horses with the intention of searching for traces of Mr. Gregory should he not have visited the rendezvous, and on the 4th October, at daybreak, we made sail. We worked our way slowly to the east, till we had nearly reached Timor Laut, when we shaped our course for Cape Wessel, but, the wind again proving contrary, only made Cape Croker on the 19th.

I had been occupied, with the help of Mr. Phibbs, in fitting saddlery to the horses for two riders and three packs, and making side-bags proportioned to the load they would be able to carry, and, as I expected light southerly winds in the Gulf of Carpentaria, in preparing the longboat to work in advance of the ship from Cape Wessel to the Albert River—thus, if it were possible, to communicate with Mr. Gregory, to inform him of the approach of the Messenger, and prevent his leaving with insufficient supplies. In this I was most cordially assisted by Captain Devine, who spent fully a week in doing everything that could be thought of to render the boat safe and comfortable.

Contrary winds and a strong current prevented our making much progress; and finding upon trial that the boat sailed faster in light winds than the ship, I determined to leave at once. I left instructions with the captain respecting the movements of the vessel; with Mr. Flood concerning the management of the party and horses; and with Mr. Graham, mate of the vessel, and Mr. Phibbs, overseer of the expedition, both of whom had volunteered for the service, I left the Messenger about 6 P.M. on the 23rd, New Year's Island bearing S.S.W. about six miles. We steered S.E. and E.S.E. all

night, going about two knots; but such was the strength of the current, that at daybreak we were barely able to weather the island. The breeze freshened during the day, and our boat, which was not more than 18 feet long, taking in much water, we were obliged to run for shelter; and reached a rocky islet to leeward of McClure Island about 10 P.M.

On the 25th, after an attempt to work to windward, we landed on the island, and spent the rest of the day in filling the open seams and stretching round the gunwales a couple of inflatable canvas tubes which the Captain had made for me. I found on the east or weather side of the island a plank of a Malay proa and several bamboo poles set upright in hollows of the rocks, most likely as signals of distress.

On the 26th we weighed at daylight and steered to the south-east with a fine breeze, falling away to calms, with squalls and heavy showers at night, against which we had no shelter, nor, from the room occupied by our water-cask and provisions, any convenient place to sleep.

On the 27th Mr. Phibbs was ill, and at night, finding that we could not stem the current, I anchored in three fathoms blue mud and shells, some miles from Sims Island. Next day I put into a small cove on the west side of Sims Island, and remained all day; Mr. Graham being attacked with a recurrence of fever and ague, from which he suffered periodically during the rest of the voyage.

On the 29th we worked through between the north and south Goulburn Islands; from the former of which three natives came off in a canoe of hollowed wood, and kept alongside, though we had a good breeze for single reefed sails. They managed their little craft with great skill, standing up in her with perfect ease, striking off the head of a rising sea with their paddles as a cricketer stops a ball, and baling out the water that entered with a large shell. One of them had a long pole, in which he inserted loosely an iron spike with a line attached to it, and stood up to spear a turtle, which, however, dived too soon. He spoke some words of English, as "Tobacco, me want him;" "Smoke him pipe;" "Berry good;" and, I thought, asked whether we were American. He told us there was water in the south island, and that his wife and piccaninnies were there. He gave a junk of turtle in exchange for some tobacco and a knife, and, when we tacked, ran along the shore with his "piccaninnies," waiting for us, in hope that we would land whenever the boat headed toward the shore. At night we landed on the north island to cook our supper, which illness prevented our enjoying.

On the 30th we stood to the south-east, with a heavy confused green sea, breaking occasionally in shallow places, and, as usual, at night had calms, with a squall, which pressed the boat's gunwale under before I could bring her to the wind, while a heavy shower drenched everything that the sea had not wetted.

In the morning we landed on a shelving beach, near Point Hall, and were joined by seven natives and a boy 13 or 14 years of age. Some of them had womeras or throwing sticks, rounded instead of flat, like those of the Victoria; but only one had a rough, sharpened pole, with which he speared a fish something like the snook of Table Bay. All except the boy were scarred, as usual. They could speak no English, but were very friendly, giving us as much of their fish as we chose to take, and sitting opposite our fire with their dogs to eat and drink the bread, pork, and tea that we gave them. They informed us that there was water to the north, where we saw the mouth of a small creek.

We had some difficulty during the day in finding a passage between a reef and the main land, and at night had strong breezes with indications of broken water. I am sorry to say that this day I found the chronometer and my watch wet through the leather case in which I kept them, and both were rendered unserviceable.

November 1st.—In the afternoon we made haul round the island, and, Mr. Graham being ill, I wished to land, but found the approach too dangerous; in attempting to work out the boat struck. We jumped out, and bore her off with no other injury than some severe cuts from the coral rocks that lamed us for several days after. I next tried another apparent harbour, but found no landing, and ran for Entrance Island, at the mouth of Liverpool River, where we found fire-places with heaps of charcoal and platforms for drying trepang, erected by the Malays.

On the 2nd it blew hard from the W.N.W. with a heavy and dangerous sea, and, after working all day, we weathered Sandy Island after sunset by little more than a quarter of a mile. The dangers of Cape Stewart and the Crocodile Islands were but imperfectly marked upon the map, and, failing to find any shelter, we were obliged to reef our sails and heave-to for the night.

In the morning of November 3rd we ran to the S.E., with a dangerous sea and breakers visible in almost every direction, to the largest Crocodile Island, where Mr. Phibbs swam ashore and discovered a small sheltered cove to which we followed him, and found the wreck of a Malay canoe and some trepang frames. The south side of the island not being marked on the map, I took sketches and bearings: it appeared to be a deep bay, fronted by other islands,

the rocks seemed hard and black like ironstone, and the rise of the tide was about 20 feet.

On the 4th we steered for Point Dale, and next day were becalmed off the opening marked as a probable strait, which, but for the loss of time, I should have been glad to explore.

On the 6th we landed at the mouth of a creek, but found it salt for a mile up and without water, except at tide-time. In the afternoon we passed, as I believe, between the main and the land marked as Point Dale on Arrowsmith's map, with a tide of nearly four knots setting to the N.W., or dead against us, and sometimes completely neutralising the boat's progress. At sunset we reached the S.W. corner of the South Wessel Island, and, tracing up a small hollow, I found pools of water, containing several gallons each, and a native fire near them.

On the 7th we were working along shore with a light breeze and contrary tide, when I saw two canoes coming off from a rock near the North Cunningham Island. They landed on Wessel Island, and seemed to bring down spears, which shortly after we saw them take into the large canoe, while they put the boys into the other, shouting to us occasionally as if friendly. I ordered the fire arms to be prepared and kept out of sight, wishing to abstain from hostilities as long as possible, and answered them in a friendly manner. They now made a trial of speed with us, and finding that they could paddle faster than we sailed, took up a position on our weather bow, and came on slowly, holding up junks of turtle, as if for barter, till they were near enough for one of them to throw a spear at us. It fell short, and he ordered the rest to paddle nearer and give him another, but at our first shot he dropped it and fell with the rest into the bottom of the canoe. Finding, however, that her sides were not bullet-proof, they jumped overboard and towed her away. Thinking them sufficiently punished, I did not pursue them; but, to show the superiority of our weapons, fired a Minié ball over them as they landed at 600 or 700 yards' distance.

On the 9th we were nearly off the Truant Island, and sailing to the S. at the rate of 60 or 70 miles a day, passed Groote Island, and made the land to the S.E. of the Pellew Islands on the evening of the 12th.

From this time we had easterly winds, against which we could not make head during the day, working round by N. to W. at night, and by S. back to E. before morning. Being now constantly at sea, we fitted up a preserved beef-tin as a furnace with another for a boiler, and, by burning the husks of cocoa-nuts dipped in oil and

chips off the trail of our bow-gun, cooked our meals when the weather permitted.

We were entangled at daybreak of the 16th among the shoals near the Forsyth Islands, but after working all day cleared them, and passing Points Bayley and Parker, steered for Investigator Road, anchoring at daybreak on the 17th, about half a mile S. of Inspection Hill, on the S.E. extremity of Sweers Island.

After an hour's rest we looked into Investigator Road, and, finding no vessel there, steered for the Albert, off the mouth of which, shortly after noon, we saw the Messenger getting under weigh, and about 2 P.M. were cordially welcomed to her decks.

The Messenger had been obliged to call at Sweers Island for water, but that in the Beagle's well, which Lieut. Chimmoo, the commander of the Torch, had considerably re-opened for our use, proved so salt as to be quite unpleasant even when boiled with rice. The few buckets of water in our cask were, therefore, fairly distributed, and I served cocoa-nuts to every one on board.

The Messenger had reached the mouth of the river on the 12th of November, or about five days before us, and Captain Devine went in with the gig to look for the marks I had agreed to leave, but of course found none. From the very gradual deepening of the water, he had not more than 11 feet at low tide nearly 8 miles from the shore, when Mr. Flood, being furnished with a boat, went up the Albert, which he found quite salt up to the farthest point reached by the Beagle's boats. He found letters which stated that Mr. Gregory, having reached the rendezvous in 60 camps from the Victoria, and having nearly four months' provisions still in hand, did not consider it prudent to wait the arrival of the schooner, and was to start on the 3rd of September for the settled districts.

The discrepancy between the account given by our party and that of Captain Stokes, of the Albert River may be easily accounted for when we remember that the boats of the Beagle visited it at the close of the rainy season, and ours after a long continuance of dry weather, and will not seem extraordinary when it is stated that we observed a difference of 15 or 20 miles in the lower limit of the fresh water of the Victoria in the wet and dry seasons.

One of the crew had died, and was buried at the anchorage.

On the 18th we anchored in Investigator Road, and, landing on Sweers Island, cleared out Flinders' well, which is in the bed of a dry gully, about 80 yards from its mouth; the upper soil being light black mould, and the lower stratum rocky. The water flowed as quickly as the men could bale it up.

On the 26th we had completed our water, and leaving a statement of our visit at the foot of Flinders' tree, on which the name of the Investigator is still legible, we commenced our homeward voyage on the 27th.

I was directed by Mr. Gregory's letters to call at Port Curtis and Moreton Bay, on the E. coast, and apprise the Government authorities there of his situation; but the time fixed for my departure having been so long past, I thought the probability of my being able to do him any service very small in comparison with the risk to which the vessel and party would be exposed, should we attempt the dangerous and intricate navigation of Torres Strait and the Inner Passage against the constant S.E. wind and lee current always experienced there.

One of our largest water casks having been gnawed through by rats, 400 gallons of water were lost. This rendered it necessary to shoot the horses and throw them overboard. They could not have been landed at the Albert without great risk and an expenditure of at least two days for each horse, and on Sweers Island there was no surface water for them to drink. Besides this, as there were no mares, no good purpose could have been answered. I had a pair of goats which I intended to leave, but the female unfortunately died. I planted cocoa-nuts in a variety of places on Sweers Island.

We experienced light variable winds, mostly from the E., till the 19th of December, when we reached Coepang, and learned that the Torch had been there and passed on to Surabaya shortly after our first visit. The former resident, T. Van Capellen, had been succeeded by a gentleman from the Cape of Good Hope named Fraenkel, who treated us with great kindness during our stay.

On the 27th, our supply of water having been filled and the vessel well furnished with live stock and vegetables, we sailed from Coepang, but a strong gale from the N.W. obliged us to put back to Pulo Borong, a small island in the same bay, where the Government cruizer is laid for security during the N.W. monsoon.

On the 30th we again put to sea, but meeting with strong westerly gales did not weather the N.W. Cape till January 30th; and subsequently meeting strong S.E. and S. winds had to stretch very far to the W.

Our allowance of water had been reduced early in the voyage, a great quantity being consumed by the live stock, and on the 12th of February we were glad to meet an American whaler, the Mechanic of Newport, the captain of which kindly filled four casks for us, and finding a westerly wind in about 39° S., we were in hope of

completing our voyage, when a change drove us again to the N., and as we were again reduced to three pints of water per day each, I thought it prudent to put into King George Sound. Here we met the steam-ship *Oneida*, which had put back in consequence of some damage to her machinery, and learned with pleasure that Mr. Gregory and party had arrived safely at Sydney, some of the passengers having conversed with members of the expedition.

On the morning of the 6th of March we left King George Sound, and entered Port Jackson on the evening of the 30th.

T. B.

The PRESIDENT then directed attention to a series of paintings, from the pencil of Mr. Baines, illustrating the natural scenery of the regions visited by him.

The second Paper read was :—

2. *Report on the Country between Mount Serle and Lake Torrens, South Australia.* By Assistant-Surveyor G. W. GOYDER.

Communicated by the Right Hon. H. LABOUCHERE, M.P., F.R.G.S., H. M. Secretary for the Colonies.

To the Hon. the Surveyor-General.

Survey Office, July 8, 1857.

SIR—I have the honour to report that, after completing, on the 2nd of May last, the survey of the road from Saltia Creek to Pichi-richi, I proceeded to join the surveyors sent to triangulate the country beyond Mount Serle.

From the summit of Mount Serle, Mount MacKinlay is seen, about 12 miles distant, to the eastward; its rounded top and precipitous sides forming the most prominent feature in the landscape. The eastern plains are clearly perceptible beyond its southern fall, intercepted by that glittering belt of sand described by Mr. Eyre as the eastern wing of Lake Torrens, and which satisfied him of the impracticable nature of the country and the existence of an insuperable barrier to his efforts in that direction.

To the north-east and south-east of Mount Serle, Arcoona Bluff and Mount Rowe, which form the termini of the extended base, present their bold and rugged outlines to the eye; while more to the south the peaks of Constitution and Exertion Hills appear—their undulating spurs extending to the south, behind the southern portion of Mount Serle, which effectually shuts out the view in that direction. To the south-west the Anglopina Pound range is most conspicuous, backed by a variety of picturesque hills—named by the settlers the Cockscomb, MacFarlane Hill, Mounts Hack, Stuart,

Charlie, and Wallace—the latter situated in front of the Pound and at the head of the Mudla-pina Gap, through which the Frome collects its various sources and winds its sinuous way to the north-north-west, until lost amid the chaos of hills skirting the western plains. To the west and north-west the scene is of a more open character, the dry bed of Lake Torrens being dimly visible, and the plain horizon extending from Mount North-west to 12° east of north, where it is broken by Mount Rose, rendering it difficult to define the northern hills, among which the most peculiar only are clearly discernible. Mounts Deception, Scott, and North-west are easily distinguished, likewise a serrated range of considerable elevation beyond the bed of Lake Torrens.

The Mount Thomas Range, distant about 30 miles from Mount Serle, is visible to the north-north-east, over the low lands between Mount Rose and Arcoona Bluff.

Generally speaking, the scenery is too extensive to be easily described; and it is only by attending to particular portions that satisfactory views can be obtained. I saw sufficient to convince me, however, that no difficulty existed to prevent the successful prosecution of the survey; and as the base-line had been measured, and the triangulation fairly commenced by the 26th of May, it only remained for me to ascertain the nature of the country and probable extent of the survey beyond Mount Serle to complete the duty upon which I was engaged.

As I am not aware that the road between Pichi-richi and Mount Serle has been previously described, it may not be out of place to give a brief sketch of the country through which it passes, prior to mentioning that to the north of Mount Serle.

Proceeding northward from the Saltia through the pass, in the direction of Balcarrie—the head station of the Messrs. Rāgless—the only objects of interest are the Devil's Peak and Dutchman's Stern, called by the blacks Ngowinyie and Yoorkakadnia. Ngowinyie is situated to the east of the pass, and is the most southern of a series of hills, differing materially in character from the general formation of Flinders Range, and to which I shall again refer when speaking of the ranges forming the various pounds. Its appearance is peculiarly striking and attractive; although the late storms have detached large portions of the peaks, from which it obtains the name given to it by the whites.

Yoorkakadnia is the name given by the blacks to that portion of Flinders Range immediately to the west of the pass—from the particular appearance of the rocks of which it is composed, *kadnia* being the native name for rock or stone. The Dutchman's Stern, how-

ever, is the northern portion of the range, which terminates abruptly in a supposed resemblance to the stern of a Dutch vessel.

About 6 miles north of the pass, a track branches to the left, over Pinkerton Creek, to Kanowie and the western plains; the road to Balcarrie continuing along the plain to Pichi-richi—a creek from which the pass takes its name—and thence to the Wiroughra Creek at Balcarrie, from whence a fine view of the surrounding country is obtained.

From Balcarrie the road bears 30° east of north, in the direction of Watts's Sugarloaf—a conical hill in the range west of Kanyaka—passing over a beautiful grassy flat for about 10 miles to the Woorianda Creek, near its junction with the Kanyaka, when the country becomes more hilly. The road continues for 5 miles farther, in the direction of the Sugarloaf, along the east bank of the Kanyaka, passing the head station of Messrs. Grant and Phillips, which is rapidly assuming the appearance of a village. It then crosses the creek and follows its west bank to its source, immediately beyond which the landscape is exceedingly fine—the Pound Range appearing to the north, with Rawnsley Bluff, Point Bonney, St. Mary's Peak, and Mount Boord in bold relief against the sky—having Chase and Elder Ranges to the right and left, springing from the long rich plains on either side of the Wornoka Creek; while, to the westward, the foreground is occupied by the Wornoka Hill and Venbulli, with its castellated rocks.

After passing the Wornoka, and crossing the plains north of that creek to the water-parting south-east of Elder Range, the country assumes a more broken appearance. The track, following a creek in a northerly direction to its junction with the Arquaba, continues along the banks of that creek to Point Bonney, passing Mr. Frank Marchant's station and Rawnsley Bluff; the former 30, and the latter 38 miles from Kanyaka. The scenery is hilly throughout, and of the most pleasing character; but the roads extremely rough and tortuous, and capable of but little improvement.

Rawnsley Bluff, Point Bonney, St. Mary Peak, and Mount Boord are the highest points of the range surrounding the Wilpina Pound, the only entrance to which is through the gap from which the waters of the Passmore find their way to the eastern plains. Of these pounds there are several in the northern districts, the Wilpina and Anglo-pina being the largest. The whole of the detached ranges, however, partake more or less of this character; and, from their appearance, justify the conclusion that they are of more recent formation than those of Flinders or the main eastern range. In the latter case, the surface is generally covered with fragments of clay-

slate weathered almost to powder, giving the hills a smooth and rounded appearance; the spurs on either side leading by easy slopes to the summit of the main range, showing that the upheaving force had acted uniformly for many miles in one direction; but, in the former, the summits are covered with huge masses of sandstone, which, from the watered appearance of the surface, seems to have been but recently removed from the bed of the ocean; while the perpendicular cliffs, forming into amphitheatres, with the strata inclining steeply inwards, induces the supposition that they have been formed at a time when the earth was submerged and violently convulsed by earthquakes, acting over an immense area, and from various centres, causing the stratified rocks to separate and sink under the superincumbent mass of water into the chasms beneath—while the outer portions were elevated to their present position—exposing the strata from the primary, to rocks of the most recent formation.

The road from Wilpina, the head station of Mr. George Marchant, follows the Passmore for about a mile to the eastward, down a valley of fine gums and groups of pines, and passing through a gap in the range, heads to the north over a broken picturesque country, to Hayward Hill, which must formerly have presented a serious obstacle to teams going north, though lately improved by a cutting made by the settlers. From Hayward Hill, the road descends by gentle undulations to a creek called the Yangana, and thence leaving Hayward Bluff to the westward, it passes over a mixed country; crossing the Eyatenah, Youngoonah, and Okultenah Creeks to the Petaton, from whence to the Neuangaran the ground is more level; but from that creek to the Awanagan, the road passes over sharp spurs, emanating from an east and west range, south of Patawata, and crosses, by dangerous sidelings, Observation and Willigan Creeks, into the bed of the Awanagan, where it joins the road from the western plains by Patachilner Creek and Oratunga, the head station of Mr. John Chambers.

After passing through the Awanagan Gap, a few miles north of the junction of the two roads, they again diverge, that to the right passing northward by way of Awanagan Hill, the Patawata Plains, and Narina to the main gap, east of the Anglo-pina Pound, the only difficulty being a steep sideling on the Awanagan Hill which a slight expense would remove, rendering available a road replete with romantic scenery—as also is that to the left of Awanagan Hill, by Waraweena, the station of Messrs. Thomas and Walter Gill; but the latter road is positively dangerous, and ought only to be used for the passage of wheeled vehicles by persons who have previously

examined the track. From Waraweena the road passes northward under Mount Hack, and joins the Narina Road near the entrance to the main gap, through which it passes; and thence, over a rough broken country, crossing the Pinda Creek—and to the east of the police station at Anglo-pina to the Mudla-pina Gap at the head of the Frome, after passing through which, Mount Serle is in sight and all difficulties cease, there being a good road to Owiandina, the station of the MacFarlanes, about 4 miles north-east of Mount Serle.

Leaving Owiandina on the 27th May, I proceeded, accompanied by William Rowe and a settler who had volunteered his company and assistance, in a north-north-east direction to Umbaratana, the station of the Messrs. Thomas, which is at present the farthest outstation, and distant about 25 miles from Owiandina, and about 3 miles south of the Mount bearing their name. The road passes over the low lands already alluded to between Mount Rose and Arcoona Bluff, crossing the Arcoona, Gammon, Fifteen Mile, and Taylor Creeks. But little of the country is seen to the south of the latter creek—Gammon and Apex Hills presenting themselves on the right and left at the more elevated portions of the road; the former a fine hill north of Arcoona Bluff, and the highest portion of a range extending in a north-easterly direction to Benbonyatha—the latter is best seen from Fifteen-mile Creek, about 10 miles west of the road and easily recognized from its name.

Taylor Creek takes its rise under the west side of the Benbonyatha Range, running first to the north-west and afterwards in a north and north-easterly direction, and becoming a tributary to the George, which forms the west branch of supply to Blanchewater, joining the MacDonnell about 2 miles south of St. Mary Pool.

At Taylor Creek, the country becomes more open—forming into well-grassed plains, extending for several miles round Umbaratana, the name of a permanent water in one of the tributaries of the Taylor.

From the Messrs. Thomas we received every attention, and next day proceeded on our journey, crossing the plains to the north-east, and following a water-way until it became a broad deep creek, winding towards the northern plains, through steep and rocky passes, and introducing us to the Yerelina, which is of a similar character, but wider, deeper, the cliffs of greater elevation, and the bed more tortuous and difficult to travel. At sundown we camped opposite some blacks' wurleys—the only good feed for the horses being in their vicinity.

Shortly afterwards I heard the voices of blacks calling to each

other, as if in alarm—most probably exclamations at discovering the proximity of white people to their camp: they must, however, have withdrawn from the neighbourhood immediately, as we heard no more of them. Next day we continued in the same direction, for about 3 miles, to a high conical hill, to the east of the Yerelina, from which we had a splendid view of the country around, which, in point of romantic scenery, surpassed anything of the kind I had ever seen. The Yamba, Nepowie, and Benbonyatha Ranges were visible to the east, south-east, and south—their elevated peaks of sandstone, fashioned by the atmosphere into fantastic forms, rearing their pointed summits high into the air; the ranges interspersed by wide and deep creeks, collecting the water from innumerable gullies on both sides of the ranges, and trending their tortuous way to the north under perpendicular cliffs of enormous elevation, and intercepting the narrow valleys with their wide stony beds, rendering the way—though delightful at first, from the beauty and variety of the scenery—difficult and harassing in the extreme. At noon we camped on the MacDonnell, resuming our journey in the afternoon, but abandoning the rocky bed of the creek, and working our way north over the ranges by bearing—continuing in the same course until noon of the next day, when we cleared the hills, and camped at a deep and permanent water in the bed of the MacDonnell, which we had crossed and re-crossed several times in our northerly course.

In the afternoon we resumed our journey down the dry bed of the creek, which gradually increased in width, with high cliffs on either side, one of which we took to be Trimmer Bluff. About two miles farther down the creek the cliffs contract, and the bed becomes rocky, and difficult to traverse—the men accompanying me passing to the eastward to avoid the rocks, while I ascended a high bluff, to examine the course of the creek beyond, and was well repaid for my trouble, by discovering that a channel, from 60 to 70 feet deep, had been cut out of the solid rock by the action of the water in times of flood, varying in width from 80 to 100 yards, and nearly a mile long, in which lay a magnificent sheet of water, running strongly at the south end, and increasing in depth towards the east bank. The margin on either side was fringed with fine gums, extending down the creek, considerably beyond the spot where the waters were again absorbed into the earth.

This scene, so sudden and unexpected, forming so great a contrast to the arid plains and sandy-looking soil composing the bed of the creek over which we had so lately passed—the placid appearance of the waters, disturbed only by the quiet enjoyment of the water-fowl,

swimming about on its surface—the rich luxuriant foliage and stately gums—afforded a feeling—a pleasure that can only be realized by persons similarly situated to ourselves.

This water, which we named the Freeling, is in latitude $29^{\circ} 45'$ south, and is well situated as a depôt for persons going north, and an easy day's journey from Blanchewater. After making a few sketches, we continued northward for about 12 miles, and camped on a gum-flat, under the west cliff of the valley of the MacDonnell, covered with quantities of succulent herbs and grass, but with no surface water.

On the following morning, while ascending the cliff north-west of our camp, and which we named Camp Hill, we were delighted to observe cockatoos flying over our heads from the north, which augured well for Blanchewater, which we had not yet seen.

From Camp Hill we took observations to Mounts Hopeless and Hopeful, the former bearing 17° , and the latter $31^{\circ} 30'$ south of east, and apparently about 25 miles off. We also took bearings to a conspicuous hill on the north-east, about $4\frac{1}{2}$ miles distant, which we named View Hill, supposing that a good idea of the surrounding country could be obtained from its summit.

On looking round from the elevation upon which we stood, it became evident that the cliffs on either bank of the creek were formerly mere undulations, rising from the general level of the plain, and that the bed in which the creek lay had been gradually washed out by the action of the water to a valley, varying in width from 1 to 4 miles.

The scene from View Hill proved to be as satisfactory as we anticipated, and was uninterrupted for a radius of at least 20 miles. There was no appearance whatever of Lake Torrens, but five large creeks could be seen to the eastward—converging into two—as they inclined to the north east, and ultimately becoming lost to view in the distance.

Descending View Hill, we proceeded due east, crossing the source of the first creek, and making the second at $3\frac{1}{2}$ miles from the hill; there were large gums growing in the bed, and pigeons flying about, but no surface water. At 7 miles we crossed the third creek with water in its sandy bed, but as this appeared salt, and the banks to be encrusted with the same substance, we were about to turn away; but the horses drinking with avidity induced us to taste the waters, which, to our surprise, we found to be perfectly fresh—and what we supposed to be common salt, a salt of ammonia brought down in solution in times of flood, and deposited upon the banks as the waters subsided, and the moisture became evaporated from the soil in the bed of the creek.

It may appear anomalous that so volatile a substance as ammonia should remain for any time in a salt exposed to the rays of the sun in sufficient quantity to be perceived. That such is the fact may be relied upon, though whether retained by the presence of any other base or not I am unable to say.

Its existence was afterwards detected by Mr. Painter, from a small sample carried in my pocket for upwards of a week, without his being informed that the salt was supposed to contain ammonia; under any circumstances, it is gratifying to know that the waters are fresh—and as I used them for two or three days without feeling the slightest inconvenience, it is reasonable to suppose that there is nothing deleterious contained in them.

A little farther to the eastward we came upon a tributary to the last creek, at a place where a quartz rock cropped out of the earth, a little to the south of which was a pool of permanent water; this rock appeared stratified, and inclined at an angle not exceeding 20° to the south-west. We continued on this bearing for 20 miles from View Hill, until Mount Hopeless bore south by west, crossing about 2 miles to the east of the fifth creek, which we named Jacob's Creek, as it appeared to emanate from the northern run claimed by that gentleman. We afterwards proceeded northward for about 2 miles, and camped in the fork at the junction of the two creeks; the land well grassed and improving in appearance towards the north-east, and the tracks of cattle numerous and recent.

On the 1st of June we traversed about 30 miles of country, extending our observation north to lat. $29^{\circ} 20'$, where the ground became soft and free from stones, the timber in the beds of the creeks assumed a more stunted appearance, and the creeks trended more to the eastward. After zigzagging the country to the south and west, we reached Blanchewater late in the afternoon; and, paying a short visit to St. Mary Pool, camped on the creek for the night.

St. Mary Pool is situated in lat. $29^{\circ} 30'$ south, and about half a mile north of Blanchewater; it is 100 yards wide by 120 long, the edges covered with reeds, and the whole surrounded by gums. The water is on a different level to that of the Blanche, which is a canal-like stream, about a mile long, and from 30 to 40 yards wide, the waters turbid and the banks lined with reeds and gum trees; while the waters of St. Mary Pool, percolating through the intervening rocks, are perfectly clear. There were quantities of teal, ducks, geese, cranes, cockatoos, pigeons, shell-parrots, magpies, curlews, crows, hawks, and other birds, flying about, and numerous tracks of cattle, but none recent.

On the morning of the 2nd we proceeded to a hill about a mile

north-west of Blanchewater, from which we obtained a tolerable view of the country in the immediate vicinity; from whence we directed our attention to a lagoon of fresh water 2 miles farther north, emanating from a number of delicious springs, which extend over a considerable area, the water running in little streams from fissures in the rocks, which protrude for several feet above the plain. Still farther to the north these springs increase in size, and are surrounded by masses of reeds, near which stand the remains of a native encampment. The ground for a considerable distance around is covered with the salt of ammonia, having a similar appearance to snow after a partial thaw, but so nearly resembling the common salt as to make it difficult to divest oneself of the idea that the springs are not really brine.

About half a mile north of the Reedy and Rocky Springs, we ascended a hill, which, although of no great height, was peculiarly conspicuous, and which, from its appearance, we named Weathered Hill; the lower portion being of slate surmounted by a coronet of sandstone—the whole surrounded by sand, separated by the action of the atmosphere from its once elevated summit.

In the extreme distance, to the north and north-east, we perceived a belt of gigantic gums, beyond which appeared a sheet of water with lands on the opposite side evidently increasing in elevation. There also seemed to be a large lake about 10 miles to the east; but this our previous experience told us had no existence. To the north-east, the MacDonnell continued its course, diverging into a number of channels as the rocks neared the surface, and again converging into one as the depth of soil increased. To the south-east, the extreme end of the eastern range was still visible, Mount Hopeful bearing south 32° east, and apparently about 30 miles distant.

From Weathered Hill, we descended in a north-easterly direction to the MacDonnell, following its course down for about 7 miles, passing several large and permanent waters, the last of which, about half a mile long, 50 yards wide, and very deep, was extremely fine, having a native encampment on the eastern bank, at its lower end. The wurleys did not appear to have been used since the rain, however, the floors being caked over and cracked by the heat of the sun. They are constructed in a similar manner to those described by Captain Sturt, and are warm and comfortable, the largest capable of holding from thirty to forty persons, being quite round, from 3 to 4 feet high, and entered by a semicircular opening, through which we were obliged to creep. This water we named the Werta-warta, from the name of the tribe frequenting the plains north of the Blanche.

Next day we continued our course to the north-east, down the bed

of the creek, for about 14 miles, passing over vegetation of the most luxuriant kind, which covers the valley for a width of from 3 to 4 miles; the timber in the creeks changing from lofty gums to a bastard peppermint, which was rapidly assuming a more stunted appearance, and the creeks bending away to the eastward. We then left the MacDonnell, and made for the nearest point of what was rapidly assuming the appearance of an immense lake; and after travelling about $6\frac{1}{2}$ miles to the north-east, our doubts were set at rest—we were in latitude $29^{\circ} 13'$, and stood upon the margin of Lake Torrens, the waters of which were unmistakeably fresh.

From the spot where my observations were taken, the lake stretched from 15 to 20 miles to the north-west, forming a water horizon extending from north-west-by-west to north-west, the south portion terminated by high land running south towards Weathered Hill, at once explaining the cause of the various creeks bending so much to the eastward. An extensive bay is formed inside this promontory, extending southward to west-north-west, when the land again runs out to a point, approaching and passing us by a gentle curve to the east, and inclining gradually to the south-east, and ultimately disappearing in the distance. The north portion of the horizon is terminated by a bluff headland, round which the water appears to extend to the north. This land passes thence to the east, and forms the north boundary of the visible portion of the lake; and, from a higher elevation than that upon which we stood, appeared to extend round to the eastern wing. It is covered with vegetation, as also are several islands seen between the north and south shores, apparently about 5 miles distant from where we stood; their perpendicular cliffs being clearly discerned by aid of the telescope.

From the first, I had anticipated finding large lakes of fresh water at the termination of the various creeks, or one large lake into which a number of them discharged their waters; but in such I should have discovered flood lines, indicating the rise and fall of the waters; and, even supposing them to have attained their maximum height, the vegetation on some portion of the surface inside the water's edge would have revealed this fact. But, in this case, there was an entire absence of such marks, the water's edge being clearly defined; and the bed changing its character so suddenly from an alluvial soil to blue loam, covered by an inch of fine silt, renders it almost beyond the possibility of a doubt, that the surface of the water is subject only to the most trifling variation of level; and the absence of deltas at the embouchures of the creeks tends to show that there is no reacting force, but that the waters, in times of

flood, flow uninterruptedly elsewhere: and I am inclined to believe, in a generally north-west direction.

In using the words unmistakeably fresh with reference to this water, I meant to imply that not only did it appear fresh to the taste, but that also there was no indication whatever of the presence of salt; and I only regretted the absence of the means which would have enabled me to test not only its extent and direction, but also its depths and action.

We afterwards proceeded due west for 20 miles, to obtain a view from the summit of the high land running from the north-west to Weathered Hill—crossing, on our way, two creeks at 10 and 13 miles distance. The first we named Duck Pond Creek, from the existence of two large waters in its bed, one of which was half a mile long, was wide, deep, and fringed with trees similar to the Blanche, with quantities of ducks swimming about. The second we called Mirage Creek, from its forming the boundary of an imaginary lake, which we supposed we were approaching, but which disappeared as we neared the elevated land. It would be perfectly useless to repeat the number of times we were deceived by mirage, and surprised by the enormous refraction peculiar to these plains; some idea of it may be obtained from the fact that the large gums, seen from Weathered Hill to the north, proved to be bushes of from 2 to 4 feet high; and a large hill seen from the summit of Mount Serle, by aid of a powerful glass, and which we estimated at about 3000 feet, dwindled down to 60. In fact, horizontal angles are of little value, and the mere appearance of water no test of its existence; but this deception is only possible when away from water, the difference being so great when in its actual presence as to render deception next to impossible.

On reaching the top of the hills we found them to be composed of table lands and sand hummocks, succeeded by ranges of a better character, forming well grassed basins and valleys; a few of which contained lagoons of fresh water, gathered from the late rains, from which the waters were rapidly evaporating.

Having now ascertained all that was necessary to enable me to give instructions relative to the extent of the survey, we retraced our steps by way of St. Mary Pool and Mount Freeling (the highest of three hills on a range running north-west to the plains, the most northern of which we supposed to be Mr. Eyre's Mount Distance—and named accordingly, the intermediate hill having been previously named Mount Gardner), taking bearings from the various hills named on our route, so as to enable the surveyors to follow and complete the triangulation, which, with favourable

weather, will in all probability be extended to Weathered Hill this season.

On the 9th of June I left Mount Serle on my way to town, after communicating with Mr. Painter, and receiving the report of his progress in the work upon which he was engaged.

During the journey I visited the stations of many of the settlers, from whom I received much useful information, and to the kindness and experience of Mr. Thomas Gill, who supplied me with sketches and local names, I owe the ease with which I was enabled to recognize places previously visited by himself and Mr. Hack.

As Lake Torrens may probably become a *dépôt* for future observations in the northern districts (a properly-constructed boat being placed upon its waters, enabling their nature and extent to be ascertained, and serving as a connecting link between the two shores), I may be permitted to suggest what appears to me to be a very easy method of improving the line of road to that locality, and of rendering a tract of at least 30,000 square miles of country available for pastoral purposes. It is, that the Government should initiate a series of wells by boring—following the principle used in the construction of Artesian wells, but avoiding the use of expensive cylinders, substituting in their stead inexpensive pipes, capable of being soldered together during the progress of the work, and so constructed at the head as to ensure their protection after the water had been obtained.

That this could be done at no great cost, there is little reason to doubt, it being well known that the large quantities of water flowing from the ranges to the plains are not lost by evaporation, but by absorption, and that it would again find its way to the surface, if not prevented by intervening strata of rock or clay; and as to penetrate through these strata is all that is required to obtain a supply of water on the surface of the ground, the expense would be but the tear and wear of the apparatus, the labour of the men required to work it, and the cost of pipes.

That the first well should be sunk at Port Augusta; and, after water had been obtained at that place, the apparatus should be placed at the disposal of the settlers upon the western plains, who would then have an opportunity of forming watering-places at pleasure, and the mountain road would cease to be used as a general line of traffic, and persons desirous of securing runs could obtain land, estimating the probable cost of a sufficient supply of water, by knowing the expense incurred in sinking the well at Port Augusta; and that port would be hastened towards that important position among the ports of the province, which, sooner or later, it

is destined to attain ; doing away, at the same time, with an inconvenience and expense known only to those persons residing in or near the township, and supplying a desideratum to the inhabitants, the value of which it is impossible to overrate.

During the journey I made numerous observations on the direction of the magnetic meridian, measuring with the utmost care the general and diurnal variations of the compass, at different altitudes on the same meridian, and in different longitudes on the same parallel ; but, being desirous of connecting these with observations made in the vicinity of town, which have been delayed by the unfavourable state of the weather since my return, I withhold the result for the present.

I have the honour to be, Sir,

Your most obedient servant,

G. W. GOYDER,

Assistant Surveyor-General.

COLONEL GAWLER.—It appears to me Lake Torrens is now the most important feature of Australian geography, and the great key to the still unknown interior. I look upon this remarkable discovery, so far to the northward and eastward, as calculated to stimulate our President, and all who are interested in this important subject, to push on with systematic and vigorous exertions.

It is almost incredible that so close to Eyre's barren route there should be a beautiful country, with fresh water, when he had given up all hopes of discovering it. This, I think, should lead us to form more favourable anticipations with reference to the character of the interior. In Australia, oasis and desert do alternate in such an extraordinary manner, that although Sturt found desert on the east, Eyre desert to the south, Gregory the same feature to the north, and Austin again to the west, yet we cannot at all say that the whole of that immense interior, of more than 800 miles in width by above 1400 miles in length, may not contain extensive, well watered, and fertile districts.

Eyre's expedition went out with a view to penetrate into the centre of Australia, as a step towards opening a communication between the south-eastern provinces and the north-western coast. The political and commercial advantages of such a line would, of course, be immense. It would at once connect Australia with India and with England, and open a route by which possibly a line of rail might be run, or, at least, stock might travel, to the rich islands of the Indian Archipelago, and the south-eastern provinces receive the produce of those islands and of China and of India in return. The south-eastern provinces have just what the Indians want,—horses, wool, copper, and stock ; and Asia just what the south-eastern provinces want,—tea, sugar, coffee, rice, silks, and cotton.

I really trust that this good land is a genuine discovery. The fresh water lake to the north is a very singular feature. I have no idea that that, or any portion of that immense lake Torrens, has been formed or can be kept up under a sun of 30° from the equator by mere local rains. I believe that the greater portion of the water is produced by extensive river and lake systems which drain the great interior.

Picture to the mind the dimensions of that lake. To judge of it by looking at home, let us place ourselves on Highgate Hill, and, if possible, stretch the eye to Gravesend or Chatham—that is the breadth of it near its south-western

extremity. Carry on this base from London to Newcastle-on-Tyne, diminishing the breadth to twelve miles ; then turn that long straight line into something like a horse-shoe shape, and you have the area of *what we know* of Lake Torrens. Such an immense mass of liquid matter cannot be the product of local rains. But we know nothing of the north-west, and nothing more of the north than that which Captain Sturt and Mr. Goyder have pointed out. Though from the hills near Mount Serle the shores of both sides of the lake to the east and west are seen, to the north-west there is an unbounded horizon. Where that goes to no one knows : perhaps to a great internal drainage.

Then there is another feature with which our present subject is connected—that “stony valley,” which Sturt crossed, of about thirty miles in breadth, that appeared like the bed of a great watercourse. It could have been but recently under inundation, for there were immense tracts of mud without a blade of grass upon them. The inundation, too, must have been of fresh water, for fresh water pools were found in the vast valley. In such a climate, mud like that would in two or three years certainly produce herbage.

That watercourse, stretching N.N.E. and S.S.W., had been recently inundated, probably by the tropical rains filling an immense reservoir of which we know nothing, but with which Sturt seemed to connect some native traditions. This watercourse, the wastepipe of a more northerly supply, coming down to a point not far from the newly-discovered fresh-water lake, is possibly the means of keeping it up. What a remarkable feature that is ! and how fraught with probabilities of more extraordinary country !

My strong persuasion is that, at no very remote period of time, Spencer Gulf was the mouth of a great river that drained the whole of the western interior of Australia. As the Murray drains the eastern interior, and forms Lake Alexandrina, near Encounter Bay, so a great drainage from the west may account for Lake Torrens. As you sail up Spencer Gulf, it has all the appearance of an estuary quite up to what is called Port Augusta. The comparatively narrow mouth near that locality becoming stopped up by the detritus brought down by the rivers, the water has extended itself into the basin that we now see filled, and, perhaps, a great deal farther, forming the immense evaporating pool of the waters of the interior. It is reported that at some seasons there is still a strong current from the lake into Spencer Gulf.

If South Australia were allowed to extend its boundaries three degrees to the west and north, it might perchance take in a tract of country which would send rich produce down to Spencer Gulf. The immense mineral riches of the south-east also might have some repetition. Already has there been a copper deposit discovered near Mount Serle, which is said to promise to rival the Burra-Burra.

It is true these are matters of speculation ; but if, on one side, we speculate on a desert, we may, on the other side, with such striking appearances, speculate on good lands and a valuable country. Remember, in that country there are not only the tropical rains falling to the north, but there is the whole sweep of the vapours of the Southern Ocean coming with the prevailing winds from the south-west. I could mention strong atmospheric evidences from personal observation, in which Mr. Eyre, in his narrative, bears me out emphatically—that there is a cool and well watered country to the northward of the Port Lincoln peninsula. Therefore, as I have already intimated, I heartily hope that the discoveries, of which we have just heard, will stimulate the Geographical Society to exert its influence to push on these researches to the uttermost.

I will only say one word more. We have seen great travellers stopped. Leichhardt we have lost ; Sturt was stopped ; Eyre was turned back to the coast ; Gregory was stopped ; Austin was stopped. We have tried to take the interior of Australia by assault. Now the late war has made us all tacti-

cians in a degree; it remains for us, therefore, before we give it up, to attempt to take it by sap.

If the interior be really a waterless desert, I would say that it is probably still perfectly traversable. Observation has led me to the strong conviction that the surface-waterless-tertiary deserts of Australia abound with sub-surface water. I should expect to find it at depths in general of not more than 120 feet. If it be so, a progressive system of wells, with dépôts, might be carried, with certainty and safety to the party employed, across every intervening desert. Twenty-four wells, about fifty miles from each other, would establish a practicable route (the whole way, if the country be surface-desert) from the south-western extremity of Lake Torrens to Stokes and Gregory Victoria.

The deserts of Australia abound with wood-fuel, and if the water were sometimes salt, boilers and condensers, light enough for bullock drays, might avert the evil.

I have no doubt whatever but that, in the worst of circumstances, Anstralia may be safely and surely traversed by patient ingenuity; and I would say that the honour of England (if there were no other motive) requires that it should be done.

The PRESIDENT.—With reference to the observations which have fallen from Colonel Gawler, I can, at this late hour, only say that I have come to another conclusion concerning the condition of Central Australia. But, whilst my own views are printed in the last Anniversary Address, I shall willingly stand corrected if his theory, founded upon a personal acquaintance with the country, should prove correct, and that our colonists should be enabled to travel across the interior of that great continent, which is generally considered to be an impassable saline desert.

The third Paper read was :—

3. *Notes from the Mission to Central Africa.*

Communicated by the Earl of CLARENDON, F.R.G.S., H.M. Secretary for Foreign Affairs.

DR. VOGEL, who had arrived at Kuka after an absence of ten months and twelve days, wrote as follows on the 4th of December, 1855 :—

“I am not able to give now a detailed account of what I have seen and done, as arranging my papers, reducing my observations, and making a map, will take at least three weeks more time, but I will describe to you, as well as I can, the road I have taken.*

“On the 20th January I left Kuka for the town of Yacóba, accompanied by Corporal Macguire and four servants. On the road I had to pass through the capital of the large province of Gombé, situated on a large tributary of the Chadda, called

* For astronomical observations upon this route, see the first volume of ‘The Proceedings of the Royal Geographical Society.’ The observations of Dr. Vogel’s route from Kuka, south to Tubori, have not reached this Society for calculation.
—ED.

Gongola, which has its source in a mountainous district 40 miles south-west of Yacóba, and runs from the W.S.W. towards E.N.E., and therefore in the opposite direction, but parallel to the Chadda, and in the same direction with the Yeou, from which river it is separated by a low plateau, about 300 feet high and 40 miles broad. Fifteen miles W.S.W. of a small Bornu town called Gabbei, in about $11^{\circ} 40'$ North latitude, and $11^{\circ} 20'$ East longitude, the Gongola makes a sudden bend towards the South, and after a course of about 100 miles more empties itself into the Chadda. In Gombé I was received very kindly by the Sultan. Thence I reached in four days Yacóba, on ascending a large granite plateau of about 2500 feet elevation, densely populated by heathen tribes, most of them entirely naked, and wearing pieces of wood of from one to two inches in diameter in their perforated upper and under lips. Two hours after my arrival in Bautshi, I was informed by the governor that I had to leave the place immediately, as he suspected me to be a spy of the Bohari, a marauding Felatah tribe, residing in the neighbourhood of Katagum, and, I am sorry to say, aided and protected by the Sultan of Bornu; the Sultan of Bautshi having been already during seven years absent at a place three days N.N.W. from the capital, waging war with a neighbouring Kerdie tribe, the Sonoma. I had some trouble in getting permission from the governor of the town for Corporal Macguire and my servants to remain, in order to make the necessary preparations for my projected journey to Adamawa. I myself left on the second day for the camp of the Sultan Sanyanni Bautshi, accompanied by only one servant. The Sultan received me very kindly, and kept me at his place for forty days, during which time I nearly fell a victim to the climate. After having suffered from dysentery for thirty-five days, I thought that change of air would be the only means of saving my life, and the Sultan not giving permission for my departure, I was obliged to leave his place secretly, being so weak that my people were obliged to lash me to the saddle. Arrived in Yacóba, I found all preparations for a farther journey made, but at the same time, to my regret, Macguire so ill, that it became necessary to move immediately for a more healthy district. We both rallied in a few days after leaving Yacóba, which is dreaded on account of its excessive unhealthiness. This circumstance is the more surprising, as Yacóba is situated on a high dry plateau, thickly studded with granitic mountains of the most extraordinary shape. On the last of April we crossed the Chadda, exactly at the spot which the steamer Pleiad had reached; numerous empty pickle and brandy bottles giving sure evidence that Englishmen had been there. We

found the Sultan of Hamarua in a small village, Tindang, a day south from the river, and to my regret, at war with the heathen tribe of Bashama, through whose country is the only road practicable for horses to Adamawa. The Sultan told me that Mohamet el Amwel from Yola had, in vain, attempted to open a communication with him, as a body of Bornu horsemen had joined the enemy. I must observe that all the numerous bands of robbers which infest Southern Sudan are openly protected and aided by the Sheik 'Amur' of Bornu, who takes a tribute from them, amounting to thirty slaves for every successful marauding expedition. After having waited nearly a month at Tindang for the opening of the road, I was reluctantly obliged to give up my attempted journey to Adamawa, but not until I was assured that this state of things would last at least six months longer; the Sultan of Yola having been beaten back with great loss; and not until a small Sokatu caravan which had tried to open the road was destroyed only half a day's distance from Tindang. On retracing my steps, I took a new route *direct* to Gombé through the countries of the cannibal tribes Yemyem and Tangale, very seldom even visited by the inhabitants of the surrounding country. The country is very mountainous, and the travelling exceedingly difficult. The Tangale inhabit a high chain of mountains on the banks of the Chadda, with a fine peak very much resembling Adam-peak in the island of Ceylon. In the middle of June I arrived at Gombé, having lost nearly all my luggage-animals; and after having sold part of the remainder of my merchandise, I proceeded on an expedition to Salia, being obliged to leave Macguire behind in Gombé with the rest of my property and to take care of the few remaining horses. During his stay of two months and a half, he experienced the greatest hospitality and kindness as well from the Sultan as from the inhabitants of the place. My journey to Salia, during the height of the rainy season, without tent and scarcely any luggage, was very difficult on account of the inundated state of the low country, and the lofty chains of mountains I had to cross. I regret that in crossing a small river I lost the numerous plants I had collected, also my thermometers, boiling water apparatus, and the better part of my merchandise. Two days from Bautshi I had to cross the Yeou at its source, and three days from Salia two little rivers flowing west, and emptying themselves into the Niger. I reached Salia towards the end of July, and was very well received by the governor, in the absence of the Sultan. This town is the largest in the interior of Africa, about 10 miles in circumference, with a ditch and an excellent wall about 15 feet high. The inhabitants do not

exceed 30,000, the great part of the space inside the wall being occupied by fields. The town bears three different names, Segseg, Salia, and Sansan; the *first* after the heathen tribe from which it was taken about the year 1807, by the Felatah of Rashna; the *second* is the new Felatah name; and the *third*, the name by which the town is known in Bautshi, and at the same time that of the whole province. The country between Bautshi and Salia is entirely inhabited by heathen tribes, mostly without any dress, ornamenting themselves with a bit of rice-straw in the upper lip. Their villages being on the top of the steepest rocks, the Sultan adopted the following plan of catching slaves: he occupied with an imposing force the fields in the valley, driving all his horses in the then green harvest, until the poor fellows on the mountains surrendered for fear of starvation, and sent down the number of boys requested of them. The Sultan thus obtained in three weeks 200 fine slaves, who were marched off immediately to Sokatu for sale.* Towards the beginning of August I proceeded from Salia to Bebetgi, one day's distance from Kano, which place I did not visit on account of the cholera being very bad there, and the Sultan having just died. From Bebetgi I returned to Bautshi by a different road through the country of independent heathen tribes, and then, following a very kind invitation from the Sultan, I proceeded once more to Tindang. After a stay of a few days there, I received an acknowledgment of the presents made by me on my first visit, *i. e.*, of 10,000 shells, or about 40 dollars, and a very fine dress; and furnished again with money, I planned a new expedition to the Chadda by a new route. Being no longer in want of the dépôt in Gombé, and the remainder of my baggage animals having recovered, I gave orders to Macguire to return to Kuka with all my servants but one.

"On the 21st of September I left Yacóba once more in a southerly direction, moving upon the town of Ukali. The road being entirely impracticable for baggage animals, I could only take as much luggage as my servant could carry on his head, consisting of a lion's skin to lie on, a blanket, a few shillings' worth of beads, and 10,000 shells. I lived for eight days entirely upon flour and water, being unable to procure anything else in the small villages on the steep and high chain of mountains along which we went. Three days from the Chadda the mountains cease, and the country, at this season of the year one sheet of water, is covered with grass 20 feet high, through which we had to cut a road, so that my

* "That Clapperton and Lander had visited the place, I heard from some of the oldest inhabitants.

progress in one day scarcely exceeded 5 miles. Arrived on the bank of the river, I was obliged to leave my horse behind; and after paddling about for three days in a miserable canoe, I arrived at last at the Rona town of Chubbún, where the Pleiad steamer had made a stop of a few days. I regret to say that I was unable to reach Ukali, only 15 miles farther inland, on account of the inundated state of the country. After stopping for some days at the aforesaid town, I went into the swamps of the river, living among the Rona in their miserable straw huts, in search of a curious fish, the *ajuh*, of which innumerable fables are told throughout the whole of Sudan. I found it to be a whale* about 10 feet long; living entirely on grass, and leaving the river when the water falls. I suffered very much from exposure to the wet and from bad victuals; nothing to be had but Indian meal and now and then a little hippopotamus and *ajuh* meat (the latter very rich). Enclosed is an accurate description of the *ajuh*, in German, to be translated by some zoologist in England, as I am not acquainted with the technical terms of English zoology.†

“At the end of October I returned to Bautshi, having lost my horse on the road. On my return to Gombé the Sultan presented me with a very fine animal, on which I reached Kuka on the 1st of December. I found Macguire and all my servants well; but it may give an idea of the difficulty of the roads I have travelled, that I lost no less than seven horses in the short space of ten months and twelve days. As soon as my papers and observations are sufficiently arranged, I will send them, and I hope that a caravan of the Ulad Solyman will start in about a month's time. As soon as possible I will start for Fittre, and proceed, if possible, as far as Wara. Should I, on my return in the beginning of May, find no letters or merchandise from Murzuk, and should I be unable to hear any news of the starting of a caravan, I will proceed for the west coast, if possible by way of Adamawa, and hope, with God's help, to reappear in the beginning of 1857, either at the mouth of the Cameroon or by way of Zalia on the Ebo, where I hope to find an English vessel to convey me to Fernando Po. But in case I should receive some supplies in the course of next year of merchandise, not exceeding 300 to 400 dollars in value, I will be able to follow up Dr. Barth's operations in Bagirmi, and in October 1856 start for Adamawa and the W. coast. If not, I will leave this in May, after my return from Wadai. I have *no wish* to leave the

* A manatee.—Ed.

† See Report of the British Association, 1856, p. 98.—Ed.

interior so soon, and will do so only on being assured that I cannot rely on any farther supplies.

"I beg to recommend to your special notice my faithful companion Corporal Macguire of the Royal Sappers and Miners, who has, notwithstanding the serious illness under which he suffered in the beginning of our journey, used every exertion to promote the object of the expedition, and behaved in the most praiseworthy manner.

"EDWARD VOGEL."

Extract of a Note from Consul G. F. Herman, Tripoli, to the Earl of Clarendon.

"MY LORD,—I have the honour to report to your Lordship the arrival here on the 14th instant of Mr. F. Warrington from Murzúk. His successor, Mr. Gaetano de Fremaux, after a long and arduous journey, reached that place on the 8th of February, and immediately assumed charge of the Vice-Consulate.

"I have farther the honour to transmit to your Lordship a copy of a despatch from Dr. Vogel, dated Kuka, 4th December last, accompanied by a description of a fish that he had discovered in the waters of the Chadda, and which he requests may be sent to some zoologist in England who understands German.

"As Dr. Vogel states to me that he had in his possession nearly 1000 dollars in money—as merchandise to the amount of 190*l.* and 100 dollars in money were forwarded to him by the last caravan that left Murzúk—and as another will not leave that place for Bornu before the end of July, if even then, I have instructed Mr. de Fremaux to retain until farther orders the 1000 dollars, which in my despatch separate No. 4, of the 8th instant, I reported to your Lordship had been remitted to Murzúk for the use of the mission; for should this money reach Kuka, as it certainly will, *after* the Doctor's movement to the southward, it would be utterly impossible to send it after him. If on the other hand the Doctor, by unforeseen circumstances, should be detained in Bornu longer than he contemplated, the money can be sent forward to Kuka. In the mean time he will have ample funds and merchandise for his present wants."

The PRESIDENT.—We are exceedingly indebted upon this, as upon many other occasions, to the Earl of Clarendon, who, as a member of this Society, loses no opportunity of communicating to us all documents relating to geographical discovery. I may, indeed, mention that I had recently the honour of waiting upon Lord Clarendon, as one of a deputation from the British Association for the Advancement of Science, with reference to the exploration of the Zambesi, when his Lordship assured us that he, on the part of the Government, was warmly disposed to offer every assistance to our enterprising and meritorious associate, Dr. Livingstone, in all his future researches; that he hoped through his agency to establish an important commerce with the natives; and that he looked upon our intercourse with the African as a subject of the greatest importance, as likely to procure for us a supply of cotton and other articles essential to the manufactures of Britain.

On a future occasion we shall have to consider a valuable memoir giving the details of Captain Burton's voyage down the east coast of Africa to the point from which he has started to pursue his adventurous journey into the interior, in which he will endeavour to determine the great question of whether there are really any lofty snow-covered mountains from whence it has been supposed the Nile may flow; or whether, as Dr. Livingstone's researches into the origin of other great African streams would suggest, the Nile does not take its source in one of the great interior lakes of that continent.

Second Meeting, Monday, November 23rd, 1857.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

ELECTIONS.—*Professor W. Haidinger, Kt., President of the Imperial Geographical Society, and Director of the Geological Institute of Vienna; and General Alberto Della Marmora, author of the Great Map of Sardinia, as Honorary Members:—and Thomas Baines, artist to the late North Australian Expedition; Septimus Beardmore; Wollaston Blake; Cheyne Brady; James Brant, Her Majesty's consul at Damascus; William Camps, M.D.; Lieut.-General Cannon; Captain R. Coote, R.N.; the Hon. C. W. Fitzwilliam, M.P.; Lieut.-Colonel W. C. Grant; Kirkman D. Hodgson, M.P.; Henry Holroyd; Richard Jefferson; Gottfried Kinkel, PHIL. DR.; G. B. C. Levenson; Captain F. Liardet, R.N.; William Loch; Matthew H. Marsh, M.P.; Rev. Allen P. Moor, M.A.; Captain J. Moore, R.N.; the Hon. W. Napier; Captain A. Phillimore, R.N.; W. H. Sitwell; Captain J. H. Speke, of the East African Expedition; Robert Tait, and Professor Tennant, were elected Fellows.*

PRESENTATIONS.—The Rev. G. R. Gleig and Messrs. F. S. and W. H. Homfray were officially introduced upon their election.

DONATIONS.—Among the donations since the previous meeting were 'Dr. Livingstone's Travels in Africa,' 'Perez-Rosales' Work on Chili,' 'Magnetical and Meteorological Observations made at the East India Company's Observatory, Bombay,' 'Fullarton's and Blackie's Atlases,' 'Transactions of the Academy of Sciences of Paris and of the Royal Society of London,' &c.

EXHIBITIONS.—A plan in relief of a portion of the Pyrenees, by the Rev. Pastor Frossard, of Bagnères-en-Bigorre; Native MS. map of Delhi; map of Cawnpūr, by Captain Yule, F.R.G.S., of the Bengal Engineers; and Stanford's map of Havelock's campaigns, &c., were exhibited.

ANNOUNCEMENTS.—The President read a letter which had been received by the Secretary, through Colonel Everest, from his friend Lieutenant-Colonel Andrew Scott Waugh, Surveyor-General of India, returning thanks for the Society's Gold Medal, which had been awarded him for the great Trigonometrical Survey of India.

10, Westbourne Street, Hyde Park,
19th November, 1857.

SIR,—I send you some extracts of letters which I have recently received from Lieut.-Colonel A. S. Waugh, which I request the favour of you to lay before the Council as soon as may be convenient to you.

GEO. EVEREST.

To Dr. Norton Shaw, Sec. R. G. Society.

Surveyor-General's Field Office, Deha Dun,
29th July, 1857.

MY DEAR COLONEL EVEREST,—I have this moment received your very kind letter of the 2nd June, announcing that the Royal Geographical Society have conferred on me their Gold Medal of the season, and as the most agreeable mode of transmitting it have selected you as their medium.

It is with great pride and gratification I thus learn that my geodetical labours in India have received this honourable mark of approbation from so distinguished and learned a Body as the Council of the Royal Geographical Society, and the pleasure I naturally feel on the occasion is doubled by my old and revered commander having been selected as the medium of transmission: for to your instruction and example I am proud to acknowledge that I owe whatever merit my labours may possess.

I am sure that this honourable distinction conferred on its present head will operate, if possible, as an additional stimulus to every member of the Survey Department to endeavour to merit the approbation of the Royal Geographical Society, by unremitting perseverance in their arduous labours.

I also feel that on an occasion like this it is necessary, with due regard to truth and justice, that I should publicly acknowledge that the merit is not entirely mine, and that although the medal has been conferred on the head of the Department, I ought to share the credit with several of its members, by whose zealous co-operation I have been enabled to effect so much. Major Tailyour, my late astronomical assistant, the friend of my early days, and my associate in so many wanderings and arduous labours; also the late Mr. George Logan, 1st assistant; Mr. J. Peyton, late chief civil assistant; Mr. W. Scott, chief draftsman in the field, and Mr. James Mulheran; all of whom, like myself, were trained up by you, have borne a large share in these interesting operations. Of those who have been trained by me in the principles laid down by yourself, I would also beg leave to enumerate Lieutenants J. Walker, J. Tennant, D. Nesmyth, T. G. Montgomerie, Mr. J. Hennessey, and Major Strange, to whose co-operation I am largely indebted.

Lieut. Montgomerie and Lieut. James Walker have especially distinguished themselves in the extension of our geographical researches on the north-western frontier, labours which, by bringing the accuracy of modern trigonometrical operations, depending on a known linear unit and point of departure, to bear on regions hitherto unexplored, or imperfectly known, have a peculiar interest and value. These officers possess remarkable talents for geographical research, as also Lieutenants Elliot Brownlow, and Bassevi, who have recently joined the department, and are now employed with Lieut. Montgomerie in that part of Tibet beyond Kashmir. In all these operations I should also again acknowledge the great assistance I have derived from Mr. W. Scott, chief draftsman, to whose vigilance, and that of Mr. J. Hennessey in detecting errors, I am greatly indebted.

I must also in justice express my warm acknowledgments to my worthy and talented deputy Major Thuillier, for his aid and co-operation in the anxious task of administering this widely extended department, and the cordial interest he has ever evinced in our geodetical labours.

Allow me, in conclusion, to beg one more favour at your hands. My wanderings in Indian jungles have little fitted me to address learned bodies, nor, surrounded as we are now by all the confusion of a military rebellion of unprecedented magnitude, do I feel that I could do justice to it, anxious as I am for the safety of our standards and records. Will you then do me the great favour to express my best thanks to the President and Council of the Royal Geographical Society for the honour conferred on me, and the Great

Trigonometrical Survey of India, and believe me always very gratefully your affectionate attached friend,

(Signed) A. S. WAUGH.

27th August, 1857.

I have a good paper on the stocks now, on the Himalaya Peaks, which, I think, will do for the Royal Geographical Society; but the unsettled state of the country, and the inundated state of the roads, make it hazardous to forward any valuable documents, while our own precarious position here is equally an objection the other way. I hope we shall be able to carry on our work without interruption. The Kashmir and Tibet Survey is progressing beautifully, and will make a lovely topographical map, which it will do your eyes good to behold. Montgomerie and Elliot Brownlow have just fixed two peaks on the Kara-Korum, one of which is 27,928 feet high, according to their field computations, its distance being 136 miles from our last stations. This would indicate the peak to be the 3rd highest yet measured. The Kashmir series has twice crossed the snowy range, with two stations each time on it. It is symmetrical and double, and a noble achievement, worthy of your successors.

A. S. WAUGH.

The first Paper read was :—

1. *Progress of the British North American Expedition, under the command of Capt. JOHN PALLISER, F.R.G.S.*

Communicated by the Rt. Hon. H. LABOUCHERE, M.P., F.R.G.S., H. M.'s Secretary for the Colonies.

Sault Sainte Marie, 10th June, 1857.

SIR,—I have the honour to report my arrival here at 4 o'clock this morning.

We started from Liverpool in the Arabia steamer, which left England at 3 P.M., May 16th, and landed at New York at 6 P.M. on the 28th May.

Immediately on landing we experienced some difficulty with the Custom-house at New Jersey (*sic*), and subsequently * were enabled to pass our instruments through, owing to the kind assistance of Mr. Pompelly of New York, whose acquaintance we casually made at our hotel next morning. Mr. Pompelly, aided by Mr. Wheatley, well known in the scientific world as an accomplished mineralogist, accompanied us on the 29th May to the Custom-house, and having explained the object of our expedition, and representing it as one directed by Her Britannic Majesty's Government, these gentlemen at length succeeded in accomplishing our object of passing the instruments, saddles, guns, &c., but not until they had called on the solicitor of the customs and conferred with the superintendent and

* The American authorities had probably not been apprised of the expedition.—ED.

several of the subordinate officers of the Custom-house. I have entered into these minutiae, as I consider the kindness of these two gentlemen and their anxiety in the furtherance of international science deserving of the highest praise.

I am much concerned at having to report about this date the bursting of one of our new barometers. I am fully convinced that this accident has not occurred from the relaxation of Dr. Hector's vigilance over the barometers, which has been most unremitting. I therefore had the instrument examined by the first makers in New York, who agreed that it might have arisen from the tightness of the metal fittings enclosing the cistern, which prevented its due expansion with a great rise in temperature, such as we experienced on landing at New York.

Mr. Pompelly, however, most kindly applied for us, and obtained one of the New York Observatory barometers, until such time as ours could be repaired and forwarded to Carlton House, or be otherwise reclaimed.

On the morning of the 2nd of June we started for Detroit *via* Elmira and the Niagara Falls. At Detroit we were detained several days, as the steamer to the Sault Ste. Marie had not yet returned; she, however, arrived on Saturday the 6th, reporting much ice still floating on Lake Superior, and also that Sir George Simpson was still detained at the Sault Ste. Marie by the ice. We have, therefore, no longer any reason to regret the delay of our departure from England, as all progress, owing to the very unusual lateness of the season, would hitherto have been denied us.

On my arrival this morning at the Sault Ste. Marie I found my two birch canoes and sixteen rowers awaiting me, and have made an arrangement with the captain of the steamer to take us up, with men, boats, luggage, and all, to Isle Royale, and, as the steamer is now starting, I conclude my Report, and remain, &c.*

Fort Garry, Hudson Bay Co.'s Territories,
16th July, 1857.

SIR,—In continuation of my Report, dated Sault Ste. Marie, June 10th, 1857, I have now the honour of acquainting you with our farther progress.

Owing to the unusual lateness of the season, Lake Superior was crowded with floating ice, offering great difficulties even to a steamer; and, after consulting experienced persons, I determined to accept the further assistance of the steamer Illinois, whose cap-

* The expedition had arrived at Pembina on the Red River in July, 1857.—ED.

tain agreed for the sum of 300 dols. to take up my two canoes on deck, 16 voyageurs, and ourselves across the Lake, and leave us near Isle Royale, about eight hours paddling distance from Fort William.

Although this might have appeared a large sum (*i.e.* 61*l.* 5*s.*), yet subsequently I had reason to congratulate myself on adopting that course, for shortly after the men and canoes were taken up, we came on fields of ice, and the captain, after pushing his way for several miles, fell in with a schooner that warned him to return and try a course along the north shore of the Lake. At length, after deviating 70 miles from his course, he succeeded, and came in sight of the island at daybreak of the 12th of June, four miles to the N.E.

We then launched, loaded, and started in our canoes, having avoided not only seven or eight days' journey, but also the risk of being stopped altogether by the ice.

We reached the mouth of the Kaministoquioah at nightfall, and arrived at Fort William at 10 P.M. on the 12th of June, where we learned that Sir George Simpson had only preceded us eleven days, having been eight days on the north shore of Lake Superior, where his canoe had been broken on the ice.

On Saturday, 13th of June, we started, and encamped some miles from the Fort, and on Sunday the 14th arrived at the mouth of the White Fish River. I halted here, and, according to my instructions, organised a party, consisting of myself and Dr. Hector, three voyageurs, and three Indians, and ascended the White Fish River. I chose these small birch canoes on account of their drawing but very little water; they could merely carry two paddlers and one passenger each, while the third, with two paddlers, took the provisions for the party, consisting of eight people in all.

I can readily understand why the existence of this river has been denied, as its mouth could be easily passed unobserved by those only travelling in canoes on the Kaministoquioah, owing to its taking a sudden bend before flowing into that river, and therefore appearing much like a recess of the Kaministoquioah.

The White Fish River varies in breadth from 40 to 60 yards, and is 5 feet deep at its mouth, but useless for purposes of navigation owing to the frequency of the rapids. We punted up a considerable portion of the stream at intervals when the rapidity of the river prevented us from paddling. In the first day of our journey up the river the barometer indicated a proximate ascent of 75 feet in 12 miles, and on the second day a farther rise of 100 feet in 6 miles. Here a very large tree fell on one of the canoes and

dashed it to pieces, I myself narrowly escaping by jumping out of the way. The rain was very severe, and the men very much exposed, being obliged frequently to get out up to their middles in water to assist in bringing up the canoes.

Owing to the accident which befel our boat with the provisions, we were obliged to return the next day.

Dr. Hector and I started accordingly on foot at 6 A.M., June 14th, straight through thick woods, in the direction of the Falls of the Kakebeka, distant, by our calculation, 27 miles, taking two Indians with us, and sending back the remaining canoes with the third Indian and the three voyageurs to the camp at the mouth of the White Fish River, with directions for the whole party to go on to the Falls of Kakebeka and meet us there.

On leaving the course of the White Fish River we ascended a steep bank into a region of larch woods, and, contrary to our expectations from the previous reports, found no difficulty in pushing forward at the rate of $3\frac{1}{2}$ miles through the country intercepted between the White Fish and Kaministoquioah Rivers, and if we could take our experience of that portion of the country for a fair average of the whole, I do not apprehend any difficulty in connecting, either by means of railroad or a common road, the country around Fort William with the south shore of Sturgeon Lake; but the accident which occurred to our boat and provisions took place before we reached the waterparting which must necessarily exist between the head of White Fish River and the waters which flow into Lake Winipeg, and therefore it still remains to be seen what amount of difficulty to overcome the waterparting will present at that point, compared with that which it offers, both on the Old Portage Route and the Northern Portage Route, which we have followed.

All this time heavy rain fell with little intermission, and detained us for several days after we had arrived at the Kakebeka Falls.

On the 23rd we reached the height of land, and next morning crossed the Savannah Portage into the Savannah River, and commenced the descent of the water-parting towards Lake Winipeg.

On the 1st July we arrived at Fort Francis on Lac la Pluie or Rainy Lake, and, while at breakfast in the fort, a large number of Indians formed a deputation, headed by their chiefs with their soldiers, and led by the old chief of the Lac la Pluie nation. It seems that they had heard a rumour of my arrival, and had organized this deputation for some time previously.* This fact I would not have taken up your time by dwelling on, were it not for the high tone which the

* See Note at p. 50.—Ed.

old chief took in his harangue, which contained in it more than the mere ordinary imagery with which they make speeches for the sake of obtaining presents. He said, "I do not ask for presents, although I am poor and my people are hungry, but I know that you have come straight from the great country, and we know that no man from the Great Queen ever came to us and lied. I want you to declare to us truthfully what the Great Queen of your country intends to do to us when she will take the country from the Fur Company's people? All around me I see the smoke of the white man to rise—the 'Long Knives' (*i.e.* the Americans) are trading with our neighbours for their land, and they are cheating them, and deceiving them. Now, we will not sell or part with our lands."

It was of no use to try and cut him short by any assurances that I was not employed to treat for the sale of his lands, and I told him confidently that if he did not wish to part with his lands, and also if he and his people behaved as always they had done, that is quietly and peaceably with the white faces, I would assure him that the Queen would never send soldiers to deprive them of their lands by force.

Here an Indian (not of their nation, but of a friendly neighbouring tribe) muttered to him in a low tone, "Make him put it into writing on a piece of paper; make him, I say: and now I have said it, for it is nothing to me one way or the other, but I know the whites on the other side where we are, and I say make him put it into writing." But the orator said aside to him, "No; what he will say he will keep to!"

"Now," continued he aloud, "what is to become of us? We have no more animals; they are all gone; and without skins the Company will not give us goods from their store; and only for the little fish we take we would starve, and many of us do starve and die." I answered that they were to blame for not endeavouring to cultivate their lands, and find other resources for maintaining themselves besides hunting. He answered, "There are none to show us, and we have no implements to do it with." He then objected to M. Bourgeau collecting plants, and requested that Dr. Hector should not take away any mineral specimens as long as we were in his territories. He also begged that the Great Queen might be made acquainted with their unhappy condition, and that she might know that his heart was grieved by reason of all those of his children who died by hunger. He asked me to promise that I would acquaint the Great Queen of these things, and to see her myself. But I satisfied him that I would write his words to the

big men that were in the habit of giving good advice to the Queen, and so we parted good friends.

All this, insignificant as it may appear, was of some importance to us, as the chiefs, with their old leader and orator, were highly excited. There were upwards of 200 Indians inside the fort, 100 of whom were armed, and our party consisted of myself and interpreter and my three companions, and the agent and storekeeper of the fort.

The conference lasted $2\frac{3}{4}$ hours, in which period I heard and replied to five speeches, and the gentlemen in charge of the post seemed greatly relieved at the Indians quietly leaving the fort on the successful issue of the conference.

On the 5th July we camped on Sturgeon Lake, at the mouth of what has hitherto been called Sturgeon River, and, according to my instructions, I started with Dr. Hector to explore back again in a S.E. direction towards the White Fish River. We had not proceeded far when what appeared merely a river turned out to be a passage to a very large lake.

We pushed across in an easterly direction and searched the opposite shore for an outlet; found a very fine waterfall, and walked up the woods without much difficulty for about a mile and a half, when we came on another lake whose dimensions appeared not far inferior to those of the first. And from all I have seen both immediately on the route and whenever I have deviated (which I have often on foot for hours while the men were resting or cooking), I have come to the conclusion that the whole country between the waterparting and Sturgeon Lake is but a mass of lakes and islands. The traversing of this country can only be effected in winter by means of sledges and snow shoes when the lakes are frozen, and the underwood, the swamp, and fallen timber are filled up by the snow, over which there is then no difficulty in travelling on snowshoes; and I was aware that this was not the proper season for carrying out the investigation on account of the large staff of men, canoes, and provisions which I would have required, and the details of which (*i.e.* those connected with running a road through a woody, swampy, and lake country) would be far better carried out by a professional engineer with a sufficient staff of assistants and lumberers—the providing of which would perhaps more immediately be the duty of the Canadian than of her Majesty's Government at home. It is much to be regretted that so many miles of deep and valuable watercarriage should be rendered unavailable by so great a number of small insignificant portages. Many of these difficulties, however, are to be overcome by engineer-

ing at but a trifling expense, and if ever the country becomes inhabited it will hereafter enjoy much facility for steam-boat communication.

On Wednesday, July 8th, we reached the Island Portage, the last on the route, whence there is uninterrupted communication by water all the way across Lake Winipeg to Lower and Upper Fort Garry, and as far as Fort Pembina on the other side of the frontier.

We reached Lower Fort Garry on Saturday, 11th; rode to the English Protestant Church on Sunday, about 4 miles distant, and were much surprised to find a large attentive congregation of Scotch people and half-breeds of various shades of colour.

The summer here is very warm, and crops seem quite, by the rapidity of their growth now, to make up for the long dreary winter of this country.

Thunderstorms are of frequent occurrence here, and though apparently not severe, yet frequently fatal to human life. While I was writing the above a flash of lightning has fallen on an Indian tent and killed one man and three women; I found two of them fearfully burnt, but the remaining two, though quite dead, are seemingly untouched. I have myself frequently, on Lac la Pluie and elsewhere on the route, observed the lightning to flash upwards from the earth to the impending cloud, when it often presents the appearance of a forked string of bright beads.

I purpose leaving this on Monday morning, with Dr. Hector, Mr. Sullivan, and M. Bourgeau, and 13 men, all well armed. We shall go as far as the frontier at Pembina, and thence along the boundary to Turtle Mountain, thence to Beaver Creek, and from thence right across to the elbow on the Lower Saskatchewan. My horses, about 30 in number, stand me an average of 20*l.* each, and the men's wages at the rate of 40*l.* per year. Traversing the Lower Saskatchewan is, I regret to say, not unattended with danger. Sir George Gore was reported as having been decoyed into a conference with the Sioux, about a year ago, and he and his party were robbed of their baggage, horses, clothes, arms, and ammunition, and he himself without even a shirt was obliged to take refuge at Fort Union, fortunately not too far away to enable them to reach alive.

I have the honour to inclose you my Secretary, Mr. Sullivan's, astronomical observations, and I have desired Dr. Hector to communicate his geological researches to Sir R. Murchison.

M. Bourgeau has been most successful in his botanical collections, and is preparing a case of flora and seeds for Sir William Hooker, which I trust will arrive safely in England before the end of October next.

I have endeavoured to embody as many of the principal incidents recorded in my journal as the short space in an official letter will permit, and I hope to have the honour of continuing this Report as soon as I have reached my winter quarters at Fort Carlton.

I have, &c.

Fort Pembina, Hudson-Bay Co.'s Territories,
27th July, 1857.

SIR,—In continuation of my Report of the 16th July, I have the honour to inform you of the departure of the Expedition from Fort Garry to Fort Pembina on the 21st instant.

I have now engaged 12 men, 30 horses, 2 small waggons, and 5 carts. In consequence of the absence of buffalo in this portion of the country, I am obliged to carry along with me a considerable quantity of provisions to last until we arrive sufficiently far to the westward to fall in with these animals. For this purpose I found the small, heavy carts of the country not sufficient, and, contrary to the advice and prejudices of the people, bought two small American waggons, and have found them most efficient.

I was not disappointed with the class and condition of the horses obtained for me by the Hudson Bay Company, as I have all along been aware that the half-breeds of Red River have taken their best horses to the summer buffalo-hunt.

I have, in order to save as much extra travelling as possible to the horses, sent on four men with four carts and ten horses straight to Beaver Creek, with orders to await our arrival in that quarter; while Dr. Hector, Mr. Sullivan, and myself take the route thither *via* Pembina and Turtle Mountain. This arrangement will serve to recruit my horses, whose pasture hitherto has not been good.

On leaving Fort Garry we crossed the river Assineboine, and proceeded up the Red River for nine or ten miles in a course a little east of south, through copse and light timber. We crossed the river Sall (*sic*) 9 miles from Fort Garry, a river about 25 yards wide, but not put down on the maps. Shortly after this we emerged on the open prairie over a well-defined road indicating a far greater amount of traffic than I had expected to find.

Owing to the peculiar distribution of the wood, which consists chiefly of fine oak-trees, confined principally to the right bank of the river, the tortuous course is very distinctly marked by jutting promontories, called by the people "points." I observed that the agricultural resources of the country were not merely confined to Red River settlement; for the country through which

we passed assumed fully equal, and in some places even superior, advantages, being more elevated above the river. I had an opportunity of noting the nature of the soil, where a settler was digging for marl, about 6 feet deep, and again at Pembina, where I had a special examination made. It consists of about 1 foot of black vegetable mould resting on a free clay loam of a light grey colour, but very deficient of sand. The banks of the rivers in this country are composed of remarkably tenacious clay mud, rendering access to them very difficult, and great care is required in passing a cart or waggon across. On the 22nd we crossed Rivière qui Grate, situated 38 miles south of Fort Garry: this river, as well as the river Sall, we passed in pontoons. The ferryman here was a very intelligent American, who had recently arrived in the country by a route from the Lake of the Woods, following the course of Reed Grass River.

He described the first 25 miles, west of the Lake of the Woods, as being flat and swampy; he partly paddled and partly dragged his canoe over a slightly rising country, until he reached Reed Grass Lake, out of which a river of the same name flows; the country about the head waters of this river is swampy: but the lower half of its course, according to his account, flows through a dry and finely-wooded country; he described the river as shallow and swift, only fit for very small canoes.

I observed large pieces of driftwood scattered about the higher spots of the prairie, indicating the extent to which the whole country is flooded in spring; by measurement I ascertained that, last spring, the water rose 35 feet above the present level of the stream, and it is by no means unusual for the flood to reach 10 feet higher. Opposite Fort Pembina the river is about 80 yards wide and 12 feet deep; in dry seasons it falls 5 feet lower. From Mr. Iddings (an American civil engineer, whose name will appear in this despatch) I ascertained that the river is 15 feet deep 200 miles farther up; but there its width is reduced to 90 feet, and the frequent occurrence of sharp bends in its course would make it difficult to ascend in steamboats.

The mouth of Pembina River, which flows from the west into Red River, is situated about 2 miles south of the boundary line. Upon this river, at a distance of about 25 miles from this, I am informed that there is a thriving American town, called San Josef's, which, owing to its recent establishment, is not yet recognised in our maps.

On Friday, July 24th (the day after my arrival here), my secretary, Mr. Sullivan, and I took the meridian altitudes of the sun, in order to find the locus of the 49th degree of north latitude, and to determine the direction of the boundary line.

We were shown at the same time a post driven into the earth to indicate a similar observation taken by Mr. Nicolay (*sic*), an American gentleman well known in the American scientific world.

The result of our observations differed by 370 yards, the American observer's result having been in favour of her Majesty.

On this occasion I availed myself of the valuable assistance of Mr. Iddings, the gentleman to whom I have alluded above, and who is commissioned to lay out lots of land from the frontier line southward, purchased by an American Land Company; and this gentleman, with my secretary, Mr. Sullivan, placed another post at about 300 yards in the direction of true west, making the necessary allowance for the variation of the compass here, which Mr. Sullivan found to be 14° E.

Mr. Iddings informed me that the land company by whom he is employed intend to build a town here, and establish a railway station about two miles distant from the posts, whose positions we have established. As yet the place is but a wild waste. The Hudson Bay Company's Fort, where we have been residing for the last two or three days, is a very small establishment, and the American one, situated about two miles on the other side of our present line, is still smaller and more wretched in appearance.

It however professes to be a post-office, and carries a mail, said to be a monthly one, from St. Paul's; but as the postmaster is away at present, and left the place under care of an Indian woman, who speaks no other language but her own, consequently I cannot form very accurate ideas as to the safety of any letters committed to its care. Still, however, I am induced to forward these by the assurance of an intelligent half-breed, who told me that the post-office here is "a very lucky one."

Enclosed is a note of the observations made on the direction of the boundary line, drawn up and signed by myself and the two gentlemen engaged in the survey.

I have, &c.,

JOHN PALLISER, Captain.

H. M. Secretary of State for the Colonies.

Extract from Private Letter from Mr. PALLISER, dated 27th July, 1857 :—

"I forgot to mention in my letter to Mr. Labouchere that the town which the Americans are about to build at our frontier line, is to be called St. Vincent. Mr. Iddings, the American engineer, told me, that as soon as he returns to St. Paul he will produce his map of the projected town and railway station, and they (the members of the Land Company) proceed to name the streets. I think I was just in time with my observation on the Boundary Line, and in coming to an understanding with the American engineer, which may perhaps be the means of avoiding unpleasant disputes by-and-bye."

Note of Observations at Pembina by Captain PALLISER, Mr. IDDIGS (U. S. Civil Engineer), and Mr. SULLIVAN :—

An observation taken at the above place by Mr. Nicolay (*sic.*) in 1848-49, places a post in latitude 49° N.

An observation taken by Captain Palliser places the same post in latitude 48° 59' 49" N.

Mr. Iddings and my secretary, Mr. Sullivan, after ascertaining the variation of the compass, erected a second post distant from the first 370 yards due east, thus determining the direction of the Boundary Line.

(Signed) JOHN PALLISER, Captain, F.R.G.S.,
Commanding British N. American Expedition.

(Signed) C. W. IDDIGS, C.E., (U. S.)

(Signed) JOHN W. SULLIVAN, Secretary and
Astronomical Assistant to the Expedition.

Locality.	Bar.	Ther.	Longitudes.			Latitudes.			Variations.		
		°	°	'	"	°	'	"	°	'	
Trembling Portage ..	29.1	61	89	59	48 W.	48	31	5 N.	6	21	E.
On Kaministiquiah ..	28.9	56	89	58	10 W.	48	40	00 N.	5	14	E.
In Lat. 48° 45' N. ..	28.8	57	89	53	0 W.	48	45	00 N.	8	54	E.
In Lat. 48° 45' N. ..	28.75	69	89	53	48 W.	48	55	00 N.	9	5	E.
Savannah Portage ..	28.62	84	90	5	0 W.	48	53	00 N.	6	53	E.
Perch Lake	28.44	81	91	12	0 W.	48	35	00 N.	8	14	E.
In Lat. 48° 27' N. ..	29.05	51	92	30	0 W.	48	27	00 N.	9	53	E.
Fort Francis	29.0	85	93	30	0 W.	48	36	00 N.	9	31	E.
In Lat. 48° 50' N. ..	29.45	83	93	58	0 W.	48	50	00 N.	11	20	E.
In Lat. 49° 26' N. ..	29.39	85	94	48	0 W.	49	26	00 N.	10	17	E.
In Lat. 50° 15' N. ..	..	..	95	17	19 W.	50	15	00 N.	15	7	E.
Lake Winnipeg .. ..	..	..	96	34	0 W.	50	33	48 N.	14	41	E.
Ditto .. ..	..	..	96	30	25 W.	50	23	48 N.	14	9	E.

N.B.—The Tabulated Longitudes are not deduced from the Tabulated Altitudes—the *Variations* only.

(Signed) JOHN W. SULLIVAN, Secretary to the Expedition.

Approved as correct,

July 17, 1857.

(Signed) JOHN PALLISER.

Locality.	Bar.	Ther.	Latitude.			Longitude.		
			°	'	"	°	'	"
Fort William	29·5	64	48	24	10 N.	89	26	10 W.
Trembling Portage	29·1	61	48	31	5 N.	89	59	48 W.
Dog Portage, west end ..	28·8	57	48	46	11 N.	89	54	45 W.
Dog River, right bank ..	28·75	69	48	56	0 N.	89	54	48 W.
Savannah Portage	28·62	84	48	53	2 N.	90	13	46 W.
Barrier Portage	28·85	79	48	45	58 N.	90	51	24 W.
French Portage	28·39	79	48	40	0 N.	91	11	30 W.
Camp Portage	28·37	81	48	15	57 N.	92	28	28 W.
In Lat. 48° 27' 5" N. ..	28·4	94	48	27	5 N.	92	30	4 W.
Fort Francis	28·41	73	48	36	15 N.	93	33	33 W.
Rainy River, left bank ..	28·5	86	48	50	0 N.	94	14	19 W.
Portage de Bois	29·06	86	49	26	8 N.	94	48	7 W.
Winipeg River	29·0	89	49	55	0 N.	94	45	30 W.
Do., right bank	28·95	92	50	15	6 N.	95	17	19 W.
Lake Winipeg, south side ..	29·0	93	50	22	58 N.	96	30	25 W.

(Signed) JOHN W. SULLIVAN, Secretary to the Expedition.

Approved as correct,

July 17, 1857.

(Signed) JOHN PALLISER.

The PRESIDENT.—We return our thanks to Mr. Palliser and his associates, and also to the Secretary of State for the Colonies, for his kindness in communicating these original documents to the Royal Geographical Society. It must be very gratifying to receive these important communications, knowing, as we do, that *the expedition originated entirely with this Society*. From what we have heard of the progress that has been made, I think we may expect the most valuable results not only to geographical and magnetical science and natural history, but also for the benefit of the nation, in clearly defining the line of boundary between the United States and the British possessions. The labours of the expedition will be still more valuable when they are extended to the Rocky Mountains, in order to discover whether there be not a passage in our own territories to Vancouver Island, that important station on the Pacific which is so full of coal and other products. Mr. Palliser and his scientific associates will examine thoroughly the geological and mineral structure of the Rocky Mountains and of the lands extending to the Pacific, and also describe the animals and plants of the whole region.

The Rev. Mr. NICOLAY, F.R.G.S.—It may interest this meeting to know that another expedition has been traversing the same country this summer, sent out by the Canadian Government, and led by Mr. Gladman, to examine the country between Lake Superior and Lake Winipeg. I regret that Mr. Palliser should have been delayed in the examination of this district, seeing that a sufficient staff had been sent out for the purpose by the Canadian Government, which had voted 5000*l.* for the purpose, and that it had been frequently traversed before. By far the most important part of the country is that which Mr. Palliser is now examining. Whatever may be the character of the country between the two lakes, it must be a long time before it can be of political interest as compared with the country to the west of Fort Garry. The last despatch of Captain Palliser shows that; and it shows also how the people of the United States are creeping up towards the boundary and settling there. There are some points to which I would draw the attention of the meeting. With reference to the country between Lake Superior and Lake Winipeg, where Captain Palliser speaks of a district of larch woods, about 27 miles in length, between the White Fish River and the Falls of the Kaministiquia. Now, that being

to the east of the water parting is an important fact, because it shows that there is a large district within the present limits of Canada fit for the habitation of civilised man. More than this, Mr. Salter, provincial land surveyor, who was sent out by the Canadian Government, writes to the effect, that in running an exploring line from Lake Nipissing to Backewanaung Bay, on Lake Superior, he came on a magnificent tract of country abounding in every requisite for immediate settlement—well watered, admirably timbered, with maple, beech, iron wood, and other hard woods, and easily accessible. I need not say how important this territory will be to Canada, but I may remark that it entirely bears out the report which Dr. Bigsby made of what he saw and heard in passing to the north of Lake Superior, with respect to this very region, which he calls, I think, the Sugar-Maple District. Mr. Gladman seems to be highly satisfied with the country which he examined. He pursued the same route as Palliser, but at a later period of the year, and he reports it as extremely fertile and good : he measured trees 9 feet in circumference. He also speaks of meeting Indians, as Mr. Palliser does ; and I confess I wish we had before the Society an account of what transpired between Palliser and the Indians, because from what happened to Mr. Gladman I should be led to think that Mr. Palliser had communications of considerable importance with them, which may render necessary the immediate interference either of our own Government or of the Canadian Government. In connection with this subject I may mention that in this morning's papers there was an account of the Mormons stimulating the Indians of the plains to attack and destroy the troops of the United States on their road to Utah. This is not on the usual route to Utah, but on the northern route by the Missouri, so that the Indians are in a state of insurrection, if not on our own boundary, at all events immediately to the south of it.*

A word dropped from you, Sir, which I hope means all that I think it does. You spoke of the expedition crossing the Rocky Mountains. I had fears that the expedition was to terminate at the Rocky Mountains.

THE PRESIDENT.—No, no.

MR. NICOLAY.—I am glad to hear that that is not the case.

THE PRESIDENT.—On the contrary, they have the most minute instructions to examine the whole of the opposite face of the Rocky Mountains.

MR. NICOLAY.—But not to go much beyond that?

THE PRESIDENT.—They are to go to the sea-board on the Pacific.

MR. NICOLAY.—My reason for asking is this :—In the evidence lately given before a Committee of the House of Commons, a great deal was said about a district called "Thomson's River District." Thomson's River flows into the Fraser River about latitude 51. Now the report of that district is, that it is one of the most fertile and admirable for settlement in the whole of North America. It is very desirable that our expedition should cross that district to ascertain whether it is so or not ; and, especially, if it be true that the people of the United States are coming from Oregon, and finding gold in very large quantities there, as stated in the Blue Book.† For many years I have had a knowledge of what is now called Thomson's River District, and I know its agricultural value to be great, though probably it is not superior to the country between it and the Rocky Mountains : of its mineral wealth I know no more than has been stated in evidence, but surely it is a most important thing that the expedition should go and ascertain the fact, if it be so. It is also distinctly asserted by those who ought to know that there is no practicable pass in the

* Here, at the request of the President, the passage of the original document, inserted in brackets at pages 41 to 43, was read.—Ed.

† This is also mentioned in the Report of the Superintendent of the Coast Survey of the United States, with reference to the population of the Washington territory.

Rocky Mountains for about 180 miles from the Kootonais Pass to that between Mounts Brown and Marker. I appeal to geographers whether there is a range of mountains in this earth which has no practicable pass in 180 miles? I have no knowledge of such a range, and I again appeal to the geographers present, and ask whether there is such a range, except it be the Rocky Mountains? I feel sure, therefore, that Mr. Palliser will find one; but if he does not ascertain the character of the country between the Rocky Mountains and the Pacific, he will come back without his laurels. For myself I think that the most important object of the expedition. And I venture to add that Government should be urged to extend the expedition to the mouth of Fraser's River, in the Gulf of Georgia, as it would be a most desirable thing both for the ends of science and for the interests of the country at large.

[Here was read an extract of a letter from Mr. Sullivan, in which the word *sceptre* occurred.]

COL. LEFROY, F.R.G.S.—I must venture to express a little doubt as to the fidelity of the report of Mr. Palliser's conference with the Indians. His interpreter must have taken some little liberty with the subject, for I doubt whether any American Indian ever talked of his sceptre or of his subjects. The government among the natives is not a monarchical one, nor are the people in the position of subjects towards their chiefs. However, that is little to the purpose. With regard to the state of distress among the Indians, it arises from causes not within the control of the Hudson Bay Company. It arises from the unproductiveness of the country. It is not frequented by any large animals, but almost entirely by rabbits. The Indians live principally on rabbits, and clothe themselves in rabbit skins. They also partly subsist on sturgeon, which they catch at times in the lakes. Sometimes they are well fed and sometimes they are in a state of lingering starvation; but this does not imply neglect on the part of those who are the temporary guardians of that territory. A considerable amount of agriculture has been practised among the Indians on the Rainy Lake. Wherever they have perseverance and diligence enough to devote themselves to garden culture they succeed; they grow potatoes, herbs, and other produce to some extent. But as a general rule, as everybody knows, they are very destitute, because they will not labour. They prefer starvation to work. I say this to turn the edge of what might seem an imputation on the rulers of those regions. With regard to Captain Palliser's account it must not be supposed that ice on Lake Superior on the 12th of June is a common thing. The last was an unusually severe winter. Generally speaking, the lake is free from ice in May. The ascent of the White Fish River is highly interesting, because if a navigable communication with Lake à la Crosse can be established by that stream it will shorten the present distance 40 or 50 miles. Looking, however, to its very short course, it can scarcely be navigable any distance: the Kakebeka itself, with numerous feeders and draining a comparatively large area, being frequently so low as to occasion many difficulties to the canoes. I hope I shall not be considered to have impugned Mr. Palliser's fidelity or veracity. That little point struck me, and it occurred to me that the imagination of his interpreter rather ran away with him. That the address is given with substantial accuracy I do not for a moment doubt.

Dr. HODGKIN, F.R.G.S.—Though I agree with Colonel Lefroy that the Indians are not ruled with sceptres, yet I think the whole of the speech could not have been an invention on the part of the interpreter. It speaks of Indians having resided for several generations on that spot, therefore I think it must be more than merely a rabbit warren. The fact that the "long-knives," the Americans, are creeping up and settling on the territory shows that it must be habitable. I am much inclined to believe that the natives have very much suffered in consequence of what has been going on, perhaps very naturally.

The trade in furs, we know, must exhaust the large and valuable animals; and as the Indians are not an agricultural people, they are very likely to suffer. The tendency of the evidence is to show that they have deteriorated in consequence of the mode of management to which they have been subjected. I do not say this to complain of any persons, but to express my strong desire, that while this portion of our dominions continues to claim the attention of Government, as a country capable of supporting man, and of being turned to profit for the English nation, the aboriginal inhabitants may not be lost sight of. Sympathy is expressed in high quarters with regard to them, but it has been a barren sympathy. Up to the present time it has not in the slightest degree arrested their decline. I have had the opportunity of conversing with the Bishop of Rupert's Land, and of corresponding with persons in that and the adjoining territories, and I know there are individuals who feel for these aboriginals. But the prevailing policy is decidedly hostile to their well-being, a fact which is greatly to be deplored.

MR. NICOLAY.—Let me remind the meeting that Mr. Palliser is no novice in Indian life. He spent two years amongst the Missouri Indians, and this is not the first conversation he has had with the natives. Therefore we may conclude that this Report is substantially correct, though it may have verbal inaccuracies.

THE PRESIDENT.—I am glad Mr. Nicolay has pointed out the qualifications of Mr. Palliser for this undertaking. He is indeed thoroughly acquainted with the American Indians. Having been a successful buffalo hunter, accustomed to the Indian sports, and having mixed much with the natives, I have not the least doubt that we shall have to thank him eventually for great geographical results.

The second Paper read was :—

2. *Notes from the Journal of the East African Expedition, under the command of Capt. RICHARD F. BURTON.*

British Consulate, Zanzibar,
22nd April, 1857.

SIR,—I have the honour to forward, for the information of the Royal Geographical Society, a field-book, containing our route survey from Pangany to Fuga, our remarks upon the coast, and an account of our expedition up to date.

On the 5th January, 1857, I intimated to you our intention of visiting the East African mainland. The death of the Imám of Muskat, H. H. Saggid Said, the undecided succession, and the troubled state of the interior, then suffering from famine, war, and drought, rendered a preparatory excursion advisable. We could obtain no useful information from the European merchants of Zanzibar, who are mostly ignorant of everything beyond the island. The Arabs and Sawahilis, who were adverse to, and fearful of, white travellers, *did* give us information, but it was worse than none. We had not heard from the Rev. Mr. Rebmann, who still remained at the Mission-house near Mombás; and, finally, it was judged expedient to be seasoned by fever on the coast before attempting the far Unyamesi Lake.

Arrived at Mombás, we visited Mr. Rebmann, who had not received the communication of the Church Missionary Society. The rev. gentleman is now at Zanzibar.

I received from Mr. Henry L. Anderson, the Political Secretary to Government at Bombay, a copy of a letter from the Medical Board of Bombay recommending that Assistant-Surgeon Steinhäusen, B.A., for whose services I had applied, should be furnished with such medicines and surgical instruments as he might consider necessary. Farther, that to assist in the advancement of scientific research, meteorological instruments may be obtained from the medical stores at Bombay, and placed at his disposal.

Under the same inclosure was transmitted for my information copy of a letter from Mr. George Buist, Secretary to the Bombay Geographical Society, dated 8th December, 1856, conveying certain useful suggestions with respect to the expedition. I am about to supply the Bombay Geographical Society with a few geological specimens and an account of copal-digging in these regions, in consequence of Mr. Secretary Anderson's letter, and hope that the Royal Geographical Society will approve of the step. I am grateful for this supply of extra instruments.

Returning to Pangany on the 21st February, we lost no time in catching the fever, as Capt. Speke, my Portuguese servant, and I, were attacked by the disorder—a severe bilious remittent—on the same day. My companions were comparatively fortunate; the fever stuck to me for a week, and left me in the condition of a bed-ridden old woman. Under these circumstances it was judged advisable to postpone the remainder of our coasting voyage, and to seek medical aid at Zanzibar without delay. We arrived here on the 6th March, and were received with his usual kindness and hospitality by Col. Hamerton. We are both recovering by degrees from the consequences of fever, and hope soon to be duly seasoned for travel into the interior. The rainy season and the s.w. monsoon have just set in, and we shall therefore be confined to the island for some time. We are now engaged in providing ourselves with an outfit, which, for economy, must be purchased before the season opens, in applying to the Prince for an escort, and in making ready the hundred *impediments* which belong to African travel.

It appears that during the present year Southern and Eastern Africa will be penetrated in various directions. At Zanzibar I lately met M. Gabriello de Rivalta, a Capucin of the Lyons French mission, who is proceeding to his head-quarters—the hitherto inaccessible Kaffa. M. Guglielmo Massaja, the “Vicario Apostolico dei Gallas,” has made that province his residence, and two other priests are living at Gudru and Enaera. Father M. Gabriello has lately

been informed from Rome that four or five other missionaries are sent to aid in the great labours reported by the Vicar-General. Nearly 400,000 Gallas have, it is said, embraced Christianity, and conversions by thousands still take place. Unable to penetrate Africa, viâ Masawwah, on account of the Abyssinian heretics, the rev. gentleman has resolved to travel alone and unarmed, viâ Makdisha (Magado) and Gananah, through the Gallas. The experiment will be most interesting.

At the Cape, an expedition has been proposed on a plan recommended by the lamented Swedish naturalist, Professor Wahlberg. Several waggons, starting simultaneously, after penetrating to a certain point northward, will separate and explore eastward and westward. At a time and place previously agreed upon, they are to meet and confer upon the propriety of continuing their journey. Nothing appears more feasible than such a project; and, indeed, it is probable that Africa can be penetrated with less fatigue and risk of disease from the Cape than from any other point.

An American expedition is also expected at Zanzibar. Some years ago Major Cothcal (*sic*), of New York, visited this coast in his own vessel, with the intention of exploring the interior. Like all others who have attempted the discovery, he failed to detect the embouchure of the Juba or Govind river, but he observed a discolouration of the sea, which has given rise to the hope of finding this mysterious outlet. It is said that the party will be composed of men accustomed to endure fatigue and to face danger, accompanied by free blacks from America, with natives of the country as guides and porters; and that no great scientific researches will be attempted from a fear of rendering the undertaking futile. This manner of exploration, which finds little favour in the eyes of the Royal Geographical Society, is eminently fitted to open a way for philosophic geographers through dangerous regions.

I have the honour to request the attention of the Council of the Society to the remarks upon the subject of maps contained in the accompanying Report. Nothing can be more erroneous, in commission and omission, than Capt. Owen's Chart of the Coast (No. X.) from Chala Point to the Pangany River. That officer himself declared that the sickness on board his ships interfered with the surveying north of Mombás; he seems not to have landed at Makdishu, or to have sought the mouth of the Yuba River. Even southward, many important places are unnoticed. The curious inlet called Tanchi, situated about $9^{\circ} 55' \text{ s.}$, a little above the embouchure of the Lindy, does not appear upon his chart. This, some years ago, was a nest of slavers, who shared their secret, it is said, with certain Zanzibar

merchants. They frequented the place till unpleasantly disturbed by H. M. S. Grecian. In making these remarks, I would by no means detract from the merit of an officer whose name has ever been mentioned with honour. But in those days a survey had but few facilities, pilots caused perpetual complaints, there had been no preparatory exploration, and interpreters could deceive as they pleased. The native names in the charts are full of blunders. Equally full of extraordinary mistakes in the maritime part are other maps, and, in fact, the only tolerable delineation of the coast from Mombás to Pangany is the Rev. Mr. Erhardt's rude sketch map, lithographed in 1850 in London.

The accounts formerly made in Europe about the facility of penetrating inland from Kilwa (Quiloa) and the economy of travel in that region are fabulous. The southern Sawahili are more hostile to explorers than the inhabitants of the northern maritime towns, and their distance from the seat of government renders them daring by impunity. But last year they persuaded the Wagindo tribe of the interior to murder a peaceful Arab merchant, in order that strangers might be deterred from interfering with their commerce. Messrs. Krapff and Erhardt, of the Mombás mission, spent a few hours at Kilwa, where they were civilly received by the Governor and citizens, but were sadly deceived in being led to imagine that they could make that part their starting-point. Lieut. Christopher, I.N., who visited the coast about the year 1843, in the H.E.I.C. brig Tigris, more wisely advises the neighbourhood of Kilwa to be avoided.

We shall probably land at Bagamoyo: as yet, however, this point cannot be determined. I scarcely anticipate being able to set out before the middle of June proximo, as the Moslim fast-month intervenes. This is a loss of time, but I will endeavour to utilize my residence upon the island by drawing up a description of it and an ethnographical account of the slave races on the neighbouring mainland.

On the 24th of March, 1857, I received from the Secretary to Government, Bombay, an official letter, transmitting a copy of a communication from the Secretary to Government of Bengal (No. 170, of 3rd of January, 1857), according permission to Captain Speke, and Assistant-Surgeon Steinhausen, B.A., surgeon, Aden, to accompany the expedition on the pay and allowances of their rank. I cannot but express the warmest gratitude to his Excellency Lord Elphinstone, to the Honourable Mr. Lumsden, and to other members of the local Government, who have added to a long list of former favours by providing me with these staunch and valued companions.

The virgin ground of Eastern Africa is a field far too extensive for a single observer. The climate of the sea-board does not yield in fatality to that of the western coast, and the jealousy of Arabs and Sawahilis may assume a more virulent form in the interior. Under these circumstances, the presence of an able surgeon and two tried men is by no means to be despised. Dr. Steinhausen has not joined us yet, but we still indulge hopes that he may be on his way.

Trusting that the Royal Geographical Society will approve of our past proceedings and of our future plans, I have the honour to subscribe myself, Sir,

Your most obedient servant,

RICHARD F. BURTON.

*To Dr. Norton Shaw, Secretary to the
Royal Geographical Society.*

The PRESIDENT then read the following extract of a letter from Zanzibar, dated July 11th, 1857.

“This day three weeks (June 16th) Colonel Hamerton sailed with the Captains Burton and Speke for Bagamoyo, to lend his personal influence on the very spot from which they were to start. Though much was still to be settled, no difficulties were experienced, and after ten days (June 26th) the Captains, accompanied by a body of upwards of 200 men (150 of whom were armed), set out on their enterprising journey.

“Four days after their departure a note from Captain Burton was received, saying that all was going on favourably. Every evening a cannon was fired from the ship to put the next heathen tribe, from whom alone some resistance was suspected to be made, in awe of the passing caravan.”

The PRESIDENT.—In returning our thanks to Captain Burton for his communication, I must say that the earlier part of it gives a compendious and clear account of that portion of the coast of Africa which he has passed along. The remainder of the paper is made up of a great deal of information obtained from various travellers on the coast. As there are distinguished African travellers in the room, I hope we may hear observations from them on this memoir.

Dr. BARTH.—It is my opinion that the account given by Mr. Rebmann and the Rev. Mr. Krapff of the Snow Mountains is not based on fact. It would be desirable that the report made by Captain Short, who ascended the river Juba, and who also, at a point farther to the north, supposed that he saw snowy mountains, should be published with all the details, that it might be seen on what facts this opinion is based, that these mountains are covered with snow. I suppose these mountains can in no way be so high as to reach the line where eternal snow can be preserved the whole length of the year, nevertheless I think that in the direction from the equator towards Kaffa there might be mountains to the elevation of 15,000 or 16,000 feet, which at certain seasons of the year, and in peculiar localities, might be covered with

snow. But it is my decided opinion that all the rivers of Central Africa, which take their course in various directions from the equatorial region, are fed exclusively by the enormous quantity of rain which falls during the rainy season, and not by snow which might be preserved on high peaks of mountains. If Captain Burton should succeed in penetrating farther into the interior, we shall certainly soon hear whether there are mountains of such great elevation as to reach the height of 15,000 or 16,000 feet. At present I think we may suppose that Mr. Rebmann was in error when he believed he saw before him mountains covered with snow, which might have been a crust of white rock such as Dr. Livingstone saw farther to the south.

Dr. LIVINGSTONE, F.R.G.S.—I know very little about that part of the country, and that little was obtained in the same way that Captain Burton got his. It may, however, be of some importance that I derived my information from a point opposite to that where the missionaries on the coast and Captain Burton had theirs. I met some Arabs from Zanzibar, in the middle of the continent, and about 15 south latitude. They pointed out a large lake to the north-east, and volunteered to take me with them on their way back to Zanzibar. They stated that when they went to Zanzibar they could either cross the southern end of that lake, or go round it. When they could get canoes it took them three days to get across, and they punted their canoes the whole way. They slept upon islands. If we take 15 or 20 miles as a good day's journey, the lake might be 50 or 60 miles across. It appears to be quite shallow. One of the Arabs used an expression which I never could understand; it was "we have 'maero'" on that lake.* This is probably an Arab word, and perhaps some of those who understand Arabic can tell what it means. There can be little doubt but that there is, as stated, a large shallow collection of water in the interior. Now the nature of the country seems to give an explanation of the mode in which this lake is formed. We have an elevated level partition in the oblong valley, in the middle of the country, so level in many parts I crossed that the water stands upon it for months together. We found the lotus plant growing in the water. When you look at these plains they seem extensive prairie land covered with grass, and amongst the grass we have the lotus flower. We saw likewise fishes that have come out of the river, and the runs of others. From this elevated partition the water, in part, flows away to the north and forms the Congo, and some goes to the south and forms the Zambesi. All the country to the east of that where I was, is of the same character—an elevated level plateau. We have two rainy seasons in the course of each year. An immense amount of water falls, and that water stands for a long time. It seems to me that nearly all the rivers in that part arise, not from fountains, but from bogs fed by percolation from the plains. A great many that I crossed had a bog on each side of them. The water seems to soak into these level plains and then ooze out through the bogs into the rivers. Probably a branch of the Zambesi rises in the vicinity of that lake. It would seem to be simply a shallow collection of water, dependent very much upon the rains, which fall in great abundance in that region. If Captain Burton gets in, as I hope he may, through the coast tribes, there can be little doubt but that he will find his way to the lake. I scarcely apprehend that it is so large as represented in the map. I went as far to the east as the 22nd degree of longitude, and it begins in the 25th. I think I must have heard of it. I was in 24° in the south, and in the north in 20° and 21°, and I got information of the country to the east of where I was travelling, but no information about this immense sea. I may state that the people in the middle of the country have all heard of the sea. They call it 'metse a hula,'

* The Arabic word was stated by Sir H. Rawlinson to mean, the water stands, or does not flow, *i. e.* is stagnant.

which means the water that grazes. When the tide rises they imagine that it is the sea coming into the land to graze; and they say to each other they must be on the look out lest the sea should come in and eat them up. Now they say nothing at all about an immense sea in the middle of the country, so I imagine it cannot be so large as represented. But it seems to be a considerable collection of water notwithstanding. Captain Burton will, I hope, settle the matter. It is scarcely worth while to speculate now when he is on the spot, for one observation is worth a waggon load of speculations. With reference to these coast tribes a question comes before us now of some interest, and that is, the revival of a species of slave-trade by the French and Spaniards on the west coast. Some have stated that it is the normal state of the Africans to be stealing each other, and buying and selling each other. I can scarcely think so. There is as much truth in that as if it were stated that the normal state of English and Scotch banks was—to break. The people on the coast get guns and gunpowder, and where they find they can pay for these things by a foray upon the inhabitants in the interior, why they have a strong temptation to go and make that foray. But it is by no means the normal state of the people in the interior. The only cause of war that ever I heard of, previous to the introduction of the slave-trade, was for cattle. They usually have some old feud, such as some of our forefathers had in Scotland; they say, “the cows that we now capture are just the calves of the calves of the cows that were lifted by the enemy’s tribe some twenty years before.” So again, they say, “Why they have just been keeping them for us all this time, and we go to bring them back.” So that it is scarcely possible to know who are the original owners of the cattle. Some tribes have actually refrained from keeping cattle altogether, on account of the wars in which the practice involved them. They say that cattle bring war, we will not keep them: they do not talk of the slaves bringing war, because they have no slaves in the interior. As to going to the coast to give payment for captives, to be called emigrants, I believe the Africans would emigrate if they knew where they were going to, and that they would come back after a number of years with property, as the Coolies can return from the Mauritius. But who can convince them that when they go across the sea—a sea of which they know almost nothing—that there they will find men in whom they can have confidence, and who will be faithful to them? It is impossible. You cannot produce that impression in the African mind. On that account, I say, it would be much better to go to Africa, where we have free labour on the spot, than be at all the bother of stealing them and carrying them to other countries. It may be said that we have fine colonies, that the West India Islands is a fine country, capable of producing any amount of sugar and other products that we need. But have the planters in the West Indies the money to pay for the labour? That is the important question. From what I hear—and I may not be well informed—the call for labour simply means a call for money. If, instead of supplying them with labour, for which they cannot pay, we supplied them with an Encumbered Estates Act, it might be beneficial to them. The small island of Mauritius has free labour, and it produces sugar equal to one-fourth the entire consumption of Great Britain. Now this small island is only 25 miles long. I think the most important part of the discoveries I was privileged to make is, that there is an immense extent of country where sugar and cotton might be cultivated. And, if people will only pay for labour, there they have it on the spot. You must not suppose that the African will work if you do not pay him for it.

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1857-8.

Third Meeting, Dec. 14th, 1857.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

ELECTIONS.—*The Earl of Carnarvon ; Lieut. J. C. Cowell, R.E. ; Lieut.-Col. H. James, Superintendent of the Ordnance Survey ; J. B. Johnston ; F. P. Keyse ; Alderman W. A. Rose ; H. Donald Spence ; and Lieut.-Col. Andrew Scott Waugh, Surveyor-General and Superintendent of the great Trigonometrical Survey of India, were elected Fellows.*

PRESENTATIONS.—*The Marquis of Breadalbane, Mr. Edwin Williams, and Mr. G. B. C. Leveson were presented upon their election.*

DONATIONS.—The following were among the donations to the Library since the previous meeting :—Raper's Navigation, sixth edition ; Superintendent Bache's Report of the United States' Coast Survey ; Statistical Report of the United States Army, by the Surgeon-General ; Report of Major Emory on the United States and Mexican Boundary Survey ; United States Naval and Astronomical Expedition under Lieutenant Gilliss ; Charts and Sailing Directions, published by the Dépôt de la Marine of France ; Atkinson's ' Oriental and Western Siberia ; ' La France Illustrée—Géographie, Histoire, &c., par V. A. Malte-Brun ; Transactions of the Franklin Institute of Pennsylvania, of the Academy of Sciences of Madrid, of the Smithsonian Institution of Washington, of the Historical Society of Wisconsin, of the American Academy of Sciences, of the Boston Society of Natural History, of St. Louis Academy of Sciences, of the American Antiquarian, Geographical, and Philosophical Societies, and of the Zoological and Statistical Societies of London, &c.

In calling attention to the numerous presentations received since the last meeting, the President specially referred to Mr. Atkinson's work on his ' Explorations in Oriental and Western Siberia and Chinese Tartary.' The work,

he added, did the highest honour to the individual who accomplished such laborious and hazardous journeys, and had made us familiar, through his artistic skill, with vast mountainous regions of the earth which had been trodden by few civilised men. He strongly commended this work to the favourable consideration of the Fellows.

ANNOUNCEMENTS.—The Chairman announced that, respecting the reported discovery of a large fresh-water lake in South Australia by Mr. Goyder, an account of which had been read at a previous meeting, Captain Freeling, the Surveyor-General, had just returned from the exploration of the so-called grassy, well-watered district, which he found to be almost entirely imaginary, and that the flood waters had disappeared. Lake Torrens was again a shoal salt lake, with immense borders of mud. After the most persevering efforts it was found impossible to launch the boat taken up by Captain Freeling. The country near the lake was also found to be of the most desolate character, exactly as our geographers Eyre, Sturt, and Frome had described it.

The papers read were :—

1. *The Exploration of Arid Countries.* By FRANCIS GALTON, Esq., M.A.,
Honorary Secretary.

THERE is no comparison between the difficulty of first exploring a desert land and that of travelling across it when its oases have been discovered. Besides the difficulties of a new road and the necessity of travelling during the heat of daylight, all first explorers labour under a peculiar and overwhelming difficulty in having the fear of a double journey perpetually before their eyes. They can never venture so far from camp as to preclude the possibility of being able to return to it without a fresh supply of water, and the extreme limit of their excursions, into the heart of the desert, is reduced to one-half of that which they (or other travellers after them) could have accomplished, if they had been assured of a watering place at the close of their journey. Again, as the *radius* of their excursions is only one-half of the length available, it follows that the *area* of their explorations may be only one-fourth as much, and, therefore, that their chance of finding an oasis, useful to others, is in that proportion less than what it would be if they became possessed of means of travelling farther. And, finally, even this limited field of exploration can only be attempted by persons who are able to endure great personal hardship, and who do not shrink from the certainty of exhausting their cattle, and the great risk of killing some of them, in each fruitless expedition. Exceptional cases doubtless occur; indeed, if it were not for these, the longer

caravan routes could never have been discovered, but, speaking generally, the difficulties of an explorer are such as I have described them to be, and any unknown fringe of desert which happens to contain no sure watering place within a circuit of a day and a half or a two days' journey will check the progress of travellers and settlers for many years.

It would therefore be a real advantage to persons who found themselves at the borders of unknown regions in arid countries, whether they were cattle owners straitened for fresh pasture land, or miners seeking for new fields of mineral wealth, as well as to leaders of expeditions who found themselves stopped by drought, if any satisfactory method could be devised by means of which the radius of exploratory trips might be largely increased, and the object of the present paper is to show that it is really feasible to devise such a scheme, and that by its aid the desert may be explored to distances fully as great as any cattle could be driven, and, lastly, that these distant explorations may readily be carried on without the sacrifice of a single meal.

I suppose an "*exploring*" party, as few in number as is consistent with efficiency, to be aided by a "*supporting*" party, who may be divided into two or more sections. The duty of this supporting party is to carry provisions, partly to be eaten on the way out, and partly to be "*câched*," or buried in the ground, in order to supply the wants of the homeward journey. After a certain distance from camp had been reached, and the loads of one "*section*" of the supporting party had become exhausted in furnishing meals and câches to the entire expedition, this section would separate from its companions and return home. A second "*section*" would subsequently act as the first had done, and afterwards a third, and even a fourth, according to their original number. Finally, the explorers would be left by themselves at some days' journey in advance of the farthest known watering place, with their own loads of provisions untouched, and with other provisions, stored in câches, fully sufficient for their return, and in every respect as capable of farther exploration as if it was from their own camp, and not from a spot in the heart of the desert, whence they were about to take their departure.

Doubtless the same general idea must often have occurred to other travellers besides myself; but whether it is because the details have been found puzzling and difficult to work out, or because the necessary vessels for carrying water were not to be met with when wanted, no traveller in arid countries has ever availed himself of the great power which this method of exploration affords.

Number of Rations that can be carried.—The following Table (1) affords, I believe, as fair an approximation as the nature of the case admits of, to the weight of rations consumed by men and cattle in an arid climate, and to the weights they are severally able to transport across a broken and a pathless country. It must be recollected that the weight carried is a diminishing one:—

TABLE 1.

	Full Rations.		Shorter Allowance.		Net Weight Transportable.	
	Water.*	Food.	Water.	Food.	On Wheels.	On Back.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Horse or mule ..	45	20	30	20	250—350	130—180
Ox	60	20	40	20	250—350	110—150
Man	10	3	..	..	..	15—25

Table 2 is deduced from Table 1. It shows how many days' rations can be transported under various circumstances. H stands for one horse; M for one man: thus the first line signifies that a horse can transport on wheels $3\frac{1}{2}$ days' rations of food as well as of water for himself and one man; the joint weight of these rations being 273 lbs.:—

TABLE 2.

	Number of Day Rations.	Food and Water for Horse and Man.	Number of Day Rations.	Water for Horse, Food and Water for Man.	
		lbs.		lbs.	
Horse { On wheels {	3½	H + m = 273	5½	H + m = 318	Full rations.
or { On back {	3½	H + 2 m = 266	5½	H + m = 236	Short rations.
Mule. {	1½	H + 2 m = 137	3½	H + m = 157	Full rations.
	1½	H + 4 m = 141	3½	H + m = 144	Short rations.
Man, on back ..	1½	M = 20	..	..	Full rations.

The general result is that a man can carry $1\frac{1}{2}$ day's rations, and that a horse can transport, according to circumstances, $1\frac{1}{2}$, $3\frac{1}{2}$, or $5\frac{1}{2}$ days' rations for himself, and for one man at least.

It is necessary to determine how many meals shall be allowed per day, in order that when a "section" of the supporting party turn back, they may do so after one of their regular meals; for it would be absurd to require that they should turn back at the end of some quaint fractional part of a day's journey after they had been supposed to have eaten a corresponding fraction of a day's

* A large bucket, full to the brim, holds 3 imperial gallons, or 30 lbs. weight of water. My full rations for a horse are two large buckets a day, each of them as nearly full of water as those given to horses usually are.

rations, and we must make our selection between a division of the day's rations into one, two, or three meals. In the steady equable travel which I have in view, I entertain no doubt that the best economy of strength and food, both in man and beast, is to be obtained by assigning them two journeys and two meals a day—a morning and an afternoon journey, and a noon and an evening meal. This, then, will be the arrangement I shall lay most stress upon.

Size of the "Sections."—The number of men that turn back would naturally bear in each case a constant ratio to the numbers that go on. If, for example, the exploring party consist of 10 men, and the detachment that last left them consisted of 10 men also, this same proportion would hold from first to last throughout the journey; that is to say, whenever a detachment broke off, the number of men that returned in it would exactly equal the number of those who continued to advance. Theoretically speaking, any proportion whatever might be adopted, but it so happens that the one I have taken as an example, half going back and half going on, is the one that is likely to be the most generally useful; for it is very simple and easy to be remembered, very generally applicable, and one of the most economical as regards work done and numbers employed. In this paper I shall give most space to its description, and simply indicate other cases which might be serviceable by drawing attention to the General Table, No. 4. To this I must again refer. At present, recurring to our *binary* system, if the exploring party consists of a number of men equal to e , the following Table (3) shows what must be the constitution and size of its supporting party, according to the number of "sections" intended to be employed in it:—

TABLE 3.—BINARY SYSTEM.

	At end of last Stage.	At end of last but one.	Of last but two.	Of last but three.	Of last but four.	&c.
Total number of Advance party ..	e	$2e$	$4e$	$8e$	$16e$	&c.
Exploring party	e	e	e	e	e	
Supporting party:—						
Latest detachment .. .. .	..	e	e	e	e	
Last but one .. .. .	..	..	$2e$	$2e$	$2e$	
Last but two .. .. .	..	..	..	$4e$	$4e$	
Last but three .. .. .	..	..	..	..	$8e$	
&c.	&c.					

Length of Stages and Loads carried.—The Table (4) (see page 64), so far as it extends, shows every case in which there can be an exact adjustment of loads, meals, and subdivisions of the party. It

is drawn up under the several conditions of one, two, or three meals being issued per day, and the details of any particular set of cases can, at once, be deduced from it.

The "*differences*" supply ready means for continuing the columns, and, if it be desired to extend the table, or to work out any question relating to the subject of it, it is easy to do so by employing the following formulæ. Let a = the number of the exploring party; b = those of the section that turns back last; s = those of the section that turns back first; m = total number of individuals (horses or men, as the case may be) employed in the expedition; l = load of day rations carried by each of them; n = number of meals into which the day ration is divided; d = distance to which the explorers are to be forwarded; r = number of stages into which d is divided; g = length of each of them reckoned in day's journey. Then, we have—

$$(1.) \quad \frac{a}{b} = \frac{ln - 2gn + 1}{2gn.}$$

$$(2.) \quad m = \frac{(a+b)^r}{a^{r-1}}$$

$$(3.) \quad s = \frac{(a+b)^r}{(a+b)^{r-1}} - \frac{(a+b)^{r-1}}{(a+b)^{r-2}}$$

$$(4.) \quad r = \frac{d}{g}$$

(5.) The additional distance that can be travelled by a , after the last section has turned back, $= \frac{ln + 1}{2n}$; if this is not integral, the integer next less than it must be adopted.

In the equation (2), if $a = 1$, and if b is an integer, then m is necessarily an integer also; but if a be greater than 1, and if $\frac{a}{b}$ be a fraction reduced to its lowest denomination, m cannot be integral, unless both it and all the terms of the series $a, b, \dots s$, be multiplied by a^{r-1} . This has been done in the headings of the fourth and subsequent columns of Table 4, and shows the cumbrous series of terms that become necessary when $\frac{a}{b}$ is other than a very simple fraction. An accurate adjustment of loads taken and of food wanted is not, however, essential, and I have therefore appended an approximative series of terms of more manageable size, and which would serve well enough, in actual practice, in cases where each man's rations were not kept separate from those of his colleagues.

Table 5: it shows the precise method according to which the

meals are dispensed in the three most useful cases of the "binary system," which are those contained in the first column of Table 4.

TABLE 5.—DISTRIBUTION OF MEALS.

Binary arrangement of Party and one Section only employed.

Distance in Day's Journey.	3 Meals, or 1½ Day Rations.	7 Meals, or 3½ Day Rations.	11 Meals, or 5½ Day Rations.	
	CAMP. —	CAMP. —	CAMP. —	
½	• • •	• • • •	• • • • •	Loads of the respective Supporting parties.
1	• •	• • •	• • • • •	
1½	•	• •	• • •	
2		• •	• •	Loads of the respective Exploring parties.
2½		• •	• •	
3		•	• •	
3½			• •	
4			• •	
4½			•	

The importance of adhering strictly to the determinations of Table 4 is very great: thus, to take a case under the "binary system," it shows that if a supporting party starts carrying more than $1\frac{1}{2}$ and less than $3\frac{1}{2}$ days' rations per man, they can give no greater assistance than if they carried $1\frac{1}{2}$ day's rations only. But, again, by looking over the Table, we find if the travellers adopted a system, such as is shown in the sixth column, that their powers of carrying 2 days' rations per head, would be utilised to the utmost, and so on in any other of the vast number of cases which might be proposed for solution. It must be recollected that a waste, which may be of little importance when the supporting party consists of one section only, becomes multiplied over and over again, and increased enormously, when many sections are employed. Again, though the Table shows the load which must be carried to meet the requirements of each case, it does not follow that we need adhere strictly to them, but, for instance, a load of 3 meals may be taken as a nominal $2\frac{5}{6}$ ths, or a load of 6 meals as a nominal $6\frac{1}{6}$ th, and the traveller feasted or fasted, as the case may be, in proportion.

RATIO $\left\{ \begin{array}{l} \text{those who go on} \\ \text{between} \end{array} \right\}$, who go back		$1 \frac{1}{1}$	$1 \frac{1}{2}$	$1 \frac{1}{3}$	$2 \frac{1}{1}$	$3 \frac{1}{1}$	$3 \frac{1}{2}$	$2 \frac{1}{3}$	$4 \frac{1}{3}$	$3 \frac{1}{4}$	$4 \frac{1}{1}$	$\delta c.$
1 meal	..	$3 \left\{ \begin{array}{l} 4 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right.$	$2 \left\{ \begin{array}{l} 9 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right.$	$2 \frac{1}{6} \left\{ \begin{array}{l} 15 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right. *$	$2 \frac{1}{2} \left\{ \begin{array}{l} 20 \text{ men.} \\ 2 \text{ days.} \\ 6 \text{ stages.} \end{array} \right.$	$2 \frac{1}{3} \left\{ \begin{array}{l} 25 \text{ men.} \\ 2 \text{ days.} \\ 4 \text{ stages.} \end{array} \right.$	$2 \frac{1}{3} \left\{ \begin{array}{l} 32 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right.$	$2 \frac{1}{3} \left\{ \begin{array}{l} 42 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right.$		$2 \frac{1}{2} \left\{ \begin{array}{l} 37 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right.$		
2 meals	..	$2 \frac{1}{2} \left\{ \begin{array}{l} 9 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right.$	$2 \frac{1}{2} \left\{ \begin{array}{l} 15 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right. *$	$2 \frac{1}{2} \left\{ \begin{array}{l} 20 \text{ men.} \\ 2 \text{ days.} \\ 6 \text{ stages.} \end{array} \right.$	$2 \frac{1}{2} \left\{ \begin{array}{l} 25 \text{ men.} \\ 2 \text{ days.} \\ 4 \text{ stages.} \end{array} \right.$	$2 \frac{1}{2} \left\{ \begin{array}{l} 32 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right.$	$2 \frac{1}{2} \left\{ \begin{array}{l} 42 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right.$	$2 \frac{1}{2} \left\{ \begin{array}{l} 52 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right.$		$3 \left\{ \begin{array}{l} 37 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right.$		
3 meals	..	$2 \frac{1}{3} \left\{ \begin{array}{l} 8 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right.$	$2 \frac{2}{3} \left\{ \begin{array}{l} 16 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right. *$	$2 \frac{2}{3} \left\{ \begin{array}{l} 24 \text{ men.} \\ 2 \text{ days.} \\ 6 \text{ stages.} \end{array} \right.$	$2 \frac{2}{3} \left\{ \begin{array}{l} 32 \text{ men.} \\ 2 \text{ days.} \\ 4 \text{ stages.} \end{array} \right.$	$2 \frac{2}{3} \left\{ \begin{array}{l} 42 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right.$	$2 \frac{2}{3} \left\{ \begin{array}{l} 52 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right.$	$2 \frac{2}{3} \left\{ \begin{array}{l} 62 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right.$	$2 \frac{2}{3} \left\{ \begin{array}{l} 72 \text{ men.} \\ 2 \text{ days.} \\ 2 \text{ stages.} \end{array} \right.$	$2 \left\{ \begin{array}{l} 86 \text{ men.} \\ 2 \text{ days.} \\ 3 \text{ stages.} \end{array} \right.$	$1 \left\{ \begin{array}{l} 2 \text{ days.} \\ 6 \text{ stages.} \end{array} \right. *$	

A traveller, wishing to make use of Table 4, must first ascertain the number of day-rations that each member of his party can transport, and then he must extract from the Table every case that corresponds with this number; out of these he will have to select the one that best meets his particular wants. To take an example, we will suppose that each of his men can carry between 2 and 3 day-rations; he will then have to copy out, as is done below, every entry in the body of the Table 4 that falls between 2 and 3. In order to compare each of these with the rest, he should roughly determine upon the distance to which he wishes to transport his exploring party—we have supposed it to be 2 days' journey out from camp. He will then write out, by the side of each of his previous entries,—1st, the number of men (including the explorers themselves) that would be required at starting in order to accomplish this journey; 2ndly, the exact distance to which the explorers will be conveyed and provisioned by the supporting party; and 3rdly, the number of stages, or, what comes to the same thing, of sections, that must be employed. In cases where the number of the exploring party, as shown in the headings to the columns of Table 4, is other than 1, the only easy way of making a comparison between the number of men required in them and in the rest is to enter them under a fractional form as $\frac{2}{4} = 5$ men. Having done this, the cases that are obviously of little use must be scored out—I have marked them with an asterisk (*)—and then a careful comparison of the rest will show the one that is the most suitable for the special requirements of the particular case. Thus the question of weight may or may not be more important than that of numbers; a single meal per day may not be objectionable, or else the heat and drought may be such that men will not work well with less than three meals; it may be essential, as a point of discipline, to keep the rations of water separate; there may not be enough trustworthy men to allow of a subdivision of the supporting party into many sections;—and so forth.

Principle of "Repetition."—Diagram No. 6 (p. 69) offers an illustration of a supporting party composed of three sections, whose numbers are respectively e , $2e$, and $4e$; the dark lines represent the outward routes, and the dotted lines the homeward ones; but by it we may also see that precisely the same effect is producible by "*repetition*" as by *numbers*. It is clearly a matter of indifference whether two men, whom we will call M and N , start from camp simultaneously, M turning back at the end of a stage and N going on, or whether a single man perform the duties of M and N consecutively, and it is quite possible that a single man might go through the whole scheme

DIAGRAM 6.

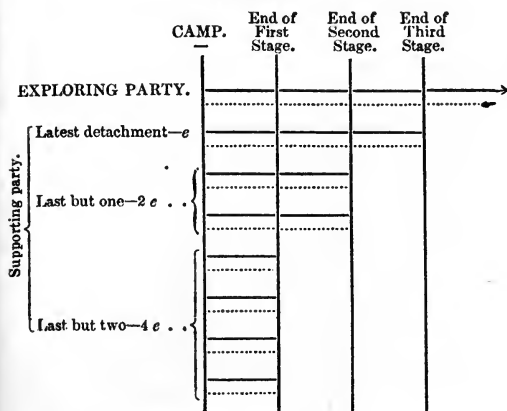
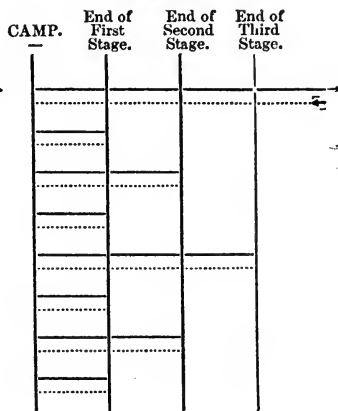


DIAGRAM 7.



of diagram (4), beginning at the lower end and ending at the upper. In his four trips to the end of the first stage, he would have transported and deposited in *câche* exactly as much as four men could have done who travelled simultaneously, and so on throughout his whole career. He, of course, would lose in time the exact equivalent of what he gained in diminution of numbers; and thus, since the above diagram represents $4e$ as being occupied for two stages (one out and one back), $2e$ during four stages, and $1e$ during six, in carrying on the work of the supporting party, it follows that, if the exploring party themselves undertook this work, they would be engaged upon it for $4 \times 2 + 2 \times 4 + 1 \times 6 = 8 + 8 + 6 = 22$ stages.*

The following little Table (8) shows how much delay is caused by employing the method of repetition for the first few stages :—

Number of stages during which the repeating method is used	1	2	3	4	&c.
Additional number of stages that have to be travelled over by parties who adopt it	2	8	22	52	&c.

The first column, and to a lesser degree the second one, are available for practical purposes.

* It would be more convenient to the exploring party to transpose the order of their trips, and to adopt that shown in diagram (7); because, as their object is supposed to be to seek for water, if it be found near at hand, a more distant excursion becomes unnecessary, and the plan of (5) would enable them to push forward the earlier stages of their exploration with as little delay as possible.

Extreme distance attainable.—I next give a Table which shows the extreme distance to which a reconnaissance may be effected in the three simple cases of the binary system, and the total number of men, including the exploring party, that would be required to work it. The explorers are supposed to carry provisions just as their supporters do. If one or more of them be exempted from portage, the extreme distance that can be reached will be somewhat diminished:—

TABLE 9.

		No "repetition" employed.			First stage repeated.			First and second stages repeated.			
Number of days' rations conveyed by each member of the entire expedition		1½	3½	5½	1½	3½	5½	1½	3½	5½	
Number of additional days' journey required owing to the employment of "repetition"		0	0	0	1	2	3	4	8	12	
Organization.		Total number.									
Organization and numbers of the entire expedition.	E	e	1	2	3	1½	3½	4½	2	4	5
	E + e	2e	1½	3½	4½	2	4	6	2½	5	7½
	E + e + 2e ..	4e	2	4	6	2½	5½	7½	3	6	9
	E + e + 2e + 4e	8e	2½	5½	7½	3	6	9	3½	7	10½
	&c.	&c.									
Extreme distance attainable.											

When men only are employed, *e* refers to their number; but when horses and men are employed together, *e* stands for the number of horses, each of which is supposed to be accompanied by one or two men, and carries provisions accordingly. (See Table 2.)

We may therefore conclude that it is easy to organise an expedition, on the binary method, which shall be able to reach and to return from points in the heart of the desert at the below-mentioned distances, without the sacrifice of a single meal, and without obtaining any other provisions than those carried by it from the camp whence the start was made:—

TABLE 10.

	In a grassy but waterless country.	In a perfectly barren country.
By caravans composed—		
of Horses in harness	From 7 to 9 days' journey.	From 4 to 6 days' journey.
of Pack horses	,, 4 to 6 ,,	,, 2 to 3 ,,
of Parties of men	,, 2 to 3 ,,	,, 2 to 3 ,,

I need not enlarge on the vast increase of field that the adoption of the above method would give to the excursions of an explorer.

A well-acclimated horse can barely be driven for four days without water in an arid country, two days out and two days home; he certainly would succumb before the close of the fifth day: and here we see that, by carrying no extraordinary weight, and by using no impracticable size of caravans, a distance of up to nine days' journey out and then back again, or 18 days in all, can be accomplished without any stint whatever as regards their commissariat.

It is not easy to specify the average distances that may be accomplished by horses working for their lives, upon short rations, but I think that the gain in using my plan may be moderately stated thus:—

A horse that carries no water may, at the risk of his life, accomplish 4 days' journey; viz. . . .	2 out and 2 home.
A horse that carries $5\frac{1}{2}$ day rations may, without stint, accomplish 6 days' journey; viz. . . .	3 out and 3 home.
A horse that carries $5\frac{1}{2}$ day rations may, at the risk of his life, accomplish 10 days' journey; viz. . .	5 out and 5 home.
A horse, backed by a supporting party, and that carries $5\frac{1}{2}$ day rations, may, without stint, easily accomplish 18 days' journey; viz.	9 out and 9 home.
A horse, backed by a supporting party, and that carries $5\frac{1}{2}$ day rations, may, at the risk of his life, accomplish 22 days' journey; viz.	11 out and 11 home.

It will make the disposition of the entire party perfectly intelligible if, in any case that may be fixed upon, a schedule of their intended proceedings be drawn out on a large sheet of paper, according to the form of Table 11. In it I have taken for an example those of a party aided by two sections organised after the binary system, each individual carrying $3\frac{1}{2}$ day rations, and two meals being issued per day. The exploring party is represented by E, and I will suppose it to consist of three men; and, therefore, the two sections which are represented by A and B will consist respectively of six and of three men. The small figures, 6, 3, 3, refer to the number of meals consumed or cached by the parties to whose names they are attached and at the places where they are entered;* by the addition of these numbers together we obtain the results printed at the foot of the several columns. For distinctness sake I have been obliged to withhold all reference to the meals carried by the relief parties, whose proceedings are indicated by small letters, *a* and *b*, and who form an expedition entirely self-sustaining and independent of the main one.

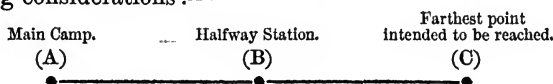
* It is not in the least necessary that a *câche* should be made at every place where a meal has to be consumed. It would be quite sufficient if a double or a treble one, as the case might be, were formed at each encampment from which a section turns back.

TABLE 11.

NO REPETITION.										FIRST STAGE REPEATED.											
	CAMP.	Encampment at end of 4 day's journey.	of 1 day's journey.	of 1½ " "	of 2 " "	of 2½ " "	of 3 " "	of 3½ " "	of 4 " "		CAMP.	Encampment at end of 4 day's journey.	of 1 day's journey.	of 1½ " "	of 2 " "	of 2½ " "	of 3 " "	of 3½ " "	of 4 " "	of 4½ " "	of 5 " "
Before starting .	A B E	6. 3. 3.									A B E	6. 3. 3.									
Noon of 1st day .		A B E										A B E									
Evening of 1st day .			6. 3. 3.										6. 3. 3.								
Noon of 2nd day .		6. A	A B E										A B E								
Evening of 2nd day .	A			3. 3.							A B E			6. 3. 3.							
Noon of 3rd day .	A			3. 3.								6. 3. 3.									
Evening of 3rd day .	A		3. B				3. E.					A B E									
Noon of 4th day .	A		3. B					3. E					6. 3. 3.								
Evening of 4th day .	A B								3. E				A B E								
Noon of 5th day .		a b						3. E						6. A							
Evening of 5th day .			a b														3. 3.				
Noon of 6th day .		a		b		3. E						6. A					3. B		3. E		
Evening of 6th day .	A				3. b E						A					3. B			3. E		
Noon of 7th day .	A				b E							a		3. B						3. E	
Evening of 7th day .	A		3. b E										3. a B								3. E
Noon of 8th day .	A	b E										3. a B									3. E
Evening of 8th day .	A B E										A B										
Noon of 9th day .												a b									
Evening of 9th day .													a b								
Noon of 10th day .												a		b							
Evening of 10th day .															3. b E						
Noon of 11th day .												A									
Evening of 11th day .												A									
Noon of 12th day .												A		3. b E							
Evening of 12th day .											A B E										
		A's load.		B's load.		E's load.						A B E's load.		A's load.		B's load.		E's load.			
		42 ½-day rations, carried by 6 men = 3½-day rations per man.		21 ½-day rations, carried by 3 men = 3½-day rations per man.		21 ½-day rations, carried by 3 men = 3½-day rations per man.						34 ½-day rations, carried by 12 men = 3½-day rations per man.		42 ½-day rations, carried by 6 men = 3½-day rations per man.		21 ½-day rations, carried by 3 men = 3½-day rations per man.		21 ½-day rations, carried by 3 men = 3½-day rations per man.			

Relief Parties.—It is easy to learn from a Table, like the above, at what date the return sections of a supporting party may be re-dispatched with fresh provisions, in order to meet E on their return, and to act as a "relief" party in case of accident or distress, and also at what depôt they may expect to meet him. There is always a great facility in sending these relief parties, and they are able to

carry a large surplus store of water, as may be understood from the following considerations :—



All the sections that turn back at B, or short of B, have time to return to A, reprovision themselves there, start afresh, and meet the exploring party on its return to B: because, from B to A and back again to B is exactly equal, in days' journey, to the distance from B to C and back again to B. If the explorers returned prematurely, the meeting would take place between A and B.

When the individuals composing the relief party travelled on their first journey, they had not only to feed and to c  che for themselves, but they had also to feed and c  che for the exploring party, and perhaps for other sections also; but, when they travel as a relief party, the equivalent to these latter supplies remains on hand as a clear overplus, to be disposed of for purposes of relief. It somewhat complicates the question to attempt the method of *repetition* with relief parties; however, the first section can always be re-dispatched immediately after its return to camp, with a heavy load of provisions to c  che at the end of the first stage, where it will meet the second section, and whence it will return with it to camp, and then, having reprovisioned themselves, they may start afresh as a relief party.

Conclusion.—It would take far too much space if I were to attempt to enter minutely into many particular cases, and it would be unnecessary if I did so, because no adventurer would ever attempt a more complicated experiment than that I am about to describe without having repeatedly practised his party at simpler ones, neither would he undertake the simplest one without having had sufficient rehearsal of it on a small scale to satisfy himself and his associates that they understood it perfectly.

The general rules to be adopted are to keep to steady day's work, neither more nor less; to mark the roads, and number the camps, so that there can be no possibility of mistake about either of them; and to make the cleverest c  ches they can. Very little delay need be apprehended from the straying of cattle, as they would soon learn to crowd to the camp, as to a water-tank, when they were thirsty.

For the purposes of c  ching and conveying water, and most kinds of food also, I know of no plan equal to that of employing one-gallon or half-gallon tins painted white, and packed securely with grass in strong hampers. 10 lbs. weight of water, or an imperial gallon, contains 277 cubic inches: and the canisters that appear to me most

convenient in size would be $4\frac{1}{2} \times 8$ inches at the base, and 8 inches high with an extra inch for the neck. 50 lbs. weight of water, in four whole canisters and two half ones, would pack side by side in a hamper measuring over all 11 inches \times 10 inches \times 2 feet 5 inches. Men would carry their loads in the way they were best accustomed to. One good plan is to drop the vessels into loose fitting bags, and to sling these at either end of a pole borne upon the shoulder. The mouth of these canisters should be like that of an ordinary tea-canister, closed with a cork, and the cork covered with a close fitting tin cap, to keep out ants and other small marauders. There can be no mistake about the number of these tins that would be required, as the Tables show the number of days' rations that must be carried for each individual of the party. The cost of a number of these vessels, sufficient to supply the wants of a large party for a long series of expeditions, would not exceed that of a single horse. If from any cause the rations appear inadequate, no danger or hardship need result to the party in consequence. It is always open to the leader of it to curtail his excursion, and to give to his cattle and men the water that was stored for their use during those stages which he now determines to stop short of. And, again, the safety of their return journey need not wholly depend upon that of the caches, since it has been shown how easy it is to dispatch relief parties for further security.

I sincerely trust that explorers in Australia may be induced to give a fair trial to my proposed method; and I would suggest to a person who wished to do so that he should make a few preparatory attempts on foot, after the following simple arrangement, with a description of which I will close this paper. Let the explorer adopt as his immediate object the investigation and survey of a line of country to the distance of one and a half day's journey into the heart of the desert. He need not carry any load of food, but let him select 7 natives as porters, and prepare the following outfit:—

- 21 half-gallon water tins, of the description mentioned above; viz. $4 \times 4\frac{1}{2}$ inches at base, and 8 inches clear height, exclusive of the neck.
- 21 food tins; being simply square tin boxes with close-fitting lids, $4 \times 4\frac{1}{2}$ inches at base and 3 inches high, a pile of three of them being of the same size as a water tin.
- 21 meals (of $\frac{1}{2}$ day rations each) of food; viz.: tea, sugar, flour, and salted meat; each ready to pack up in its separate food-tin.
- 14 light canvas bags; each capable of holding two water tins, or else one water-tin and a pile of three food-tins. The bags to be adapted for slinging from a pole, and having long enough necks to admit of their being sewn up or otherwise well secured against tampering.
- 1 large spare bag; a very light one, capable of holding four sets of food and water tins.
- 7 strong light poles; six feet in length, to be carried on the shoulder, to each end of which a canvas bag is to be slung; the one bag containing

2 water tins, and the other 1 water tin and 3 food tins, or exactly three complete meals in all.

The expedition will consist as follows:—

The explorer E_1 carrying nothing, and his attendant E_2	
carrying 3 meals and the spare bag	or 3 meals in all.
Two natives B_1 and B_2 carrying 3 meals each	or 6 meals in all.
Four natives $A_1 A_2 A_3 A_4$ carrying 3 meals each	or 12 meals in all.

Let them start in the early morning and travel for half-a-day, say $4\frac{1}{2}$ hours, without stopping; then let them encamp at Camp I., and take a meal out of the loads of the party A, the packages of B and of E being left untouched: there are 8 mouths to feed and 12 meals, leaving an overplus of 4 meals. In the afternoon the party A is sent back to camp with 8 empty sets of tins, and each of the parties B and E take 2 meals and c  che them separately, and then proceed on their journey for another $4\frac{1}{2}$ hours. At night, at Camp II., B's packs are opened, the 6 meals are taken out, and 4 of them are eaten by B and E, while the 2 remaining ones are given to E, who c  ches them. In the morning, B turns back and the party E pursues its journey (B opens its c  che at Camp I. at midday, and, having eaten the 2 meals contained in it, stores the empty tins in the places left vacant in its bags by the two meals left behind with E, and starting in the afternoon, reaches the home party at night). The party E travels on for half-a-day to Camp III., and then its men eat two of their meals; the third is intended to be kept as a reserve in case of any emergency. In the afternoon they fall back upon Camp II., dig up their c  che, eat the food contained in it, and place the empty tins in the spare bag. In the morning they start for Camp I., reach it at noon, dig up the c  che, eat their meals, and carry off the empty tins as before, and reach the home party at night.

The next adventure, which I will not describe in detail, might be to leave the parties A, B, and E exactly as before, but to lade the explorer E_1 with three meals, and also to make a repeated journey of one long half-day's stage. In doing this, 16 extra sets of tins would be found necessary, and a distance of $2\frac{1}{2}$ days' journey from camp would be finally reached.

The PRESIDENT directed the attention of the Fellows to the value of Mr. Galton's labours in elaborating such a scheme for the guidance of travellers in dry and arid countries, and mentioned his calculations as being analogous to those by which a quartermaster-general enabled troops to make effective marches.

DR. BARTH, F.R.G.S.—I think the plan proposed by Mr. Galton suitable to a country like Australia, where the danger of the c  ches being destroyed by barbarous tribes is not very great; but it is not applicable to such a country as Northern Africa, where a d  p  t cannot be deposited without running the risk of

being discovered by the tribes who constantly infest the roads, so that the supplies may be destroyed or removed. In traversing deserts like those of Northern Africa, I think a traveller must always rely upon the provisions he takes with him. I have travelled through the desert with two horses, and I was obliged to take corn for them for sixty days. Water is found at the different wells, at four, five, and six days' distance apart. Mr. Galton's calculation with reference to the quantity of water required by the horses is quite right, for I found, when water was not abundant, that a skinfull, from 40 to 50 lbs. weight, was sufficient for each horse. There was very little herbage, and I gave each animal about 10 lbs. weight of corn per day, and they went on very well with that supply.

MR. ATKINSON, F.R.G.S.—The mode in which I travelled over the steppes of Central Asia is very different from what Mr. Galton has described. In most parts of these regions (except in the Gobi) we can find water by digging into the sand, from 5 to 7 feet deep. The water is very brackish, still the horses will drink it, and tea can be made with it—it is not an agreeable beverage—necessity alone makes a man drink it. We had a mode of travelling much more rapid when crossing the arid plains than that suggested by Mr. Galton. To travel with wheeled carriages is absolutely impossible. We travelled on horseback, each individual of the party taking three horses and 3 or 4 lbs. of prosei, a species of millet, in a small bag slung to his saddle-bow. This and a glass of tea or water make a meal: in this way about 300 verstas can be traversed in twenty-four hours. On our journey we frequently endured great privation from want of food, and in many instances we suffered from want of good water, as the tea made with water from the well was often exceedingly nauseous and unwholesome.

COUNT STRZELECKI, F.R.G.S.—I can bear testimony to the value of Mr. Galton's suggestions with regard to the deserts already ascertained. There are parts of North America, where the United States Government is now engaged in an expedition against the Mormons at Salt Lake, a district separated from civilisation by a belt of desert, similar to a desert in Africa, where relief parties pursuing the system suggested by Mr. Galton would be of the greatest possible value. There are deserts in South America that I have visited to which the system would be perfectly applicable; as also the two routes of desert in Australia, one in the northern and the other in the southern region—where it is well known that beyond a certain distance you cannot penetrate without taking supplies for both men and beasts. But in passing through a *terra incognita* to a given point on the chart—when you know nothing beyond the horizon you see—it is almost impossible to apply a system or devise means which may insure you against the want of water and provisions. To advance boldly with supplies calculated approximatively upon the time requisite to accomplish your section of exploration is all that you can do. During five years of my surveys in Australia, it was my lot on one occasion to travel through a country untrodden by white men. The party consisted of seven men and six pack-horses, carrying our supplies of flour, tea, and bacon, sufficient for five months, the maximum of time calculated as necessary for the accomplishment of the self-imposed task. Notwithstanding the unexpected ranges of mountains and rivers which we met on our way, and which retarded our progress, we were actually within 35 miles of our destination, when our journey was suddenly arrested, not by want of provision or water, but by a belt of impracticable brushwood, which forced us to abandon the pack-horses and collections, and cut our way through at a rate of 1½ mile a day the best we could. In such explorations there is no system which can extricate you, except common prudence, determination, and extremely vigorous constitutions. I believe that the expedition of the United States Government failed for want of a proper system of conveying the troops through the desert, which is not perhaps very

extensive ; but still presenting such difficulties that without an organised system of provisioning troops as suggested by Mr. Galton, it is impossible for them to traverse it.

MR. PLINY MILES, of the United States.—I have travelled through some of the wild parts of North America, and I can confirm Dr. Barth with respect to the danger of the natives discovering and destroying the caches. A method found successful for preserving a cache has been adopted by some American travellers. At a convenient distance from, but not too near the real cache, they make a false one, put in a small quantity of provisions, and make numerous footmarks about it. The Indians come and find the place, and suppose that it is the only cache there. But it requires a great deal of art to deceive them. In some seasons of the year travellers get along better with a supply of parched Indian corn than to rely entirely on animal food. The corn is light and very nourishing. Buffalo meat, dried and salted with care, and placed in caches, will keep a long time. I quite agree with Count Strzelecki as to the cause of the failure of the United States expedition.

MR. GALTON, F.R.G.S.—I ought to explain that I consider my method especially applicable to untraversed tracts of open country, that resist the efforts of explorers on account of their aridity and extent, such as exist in many parts of Australia, and which it is the object of an advancing civilization to explore systematically. In countries that are half desert, where there are natives prowling freely about, my method would be of less service, even if the security of the caches were unquestionable. When expeditions were planned upon a large scale the caches and depôts might easily be guarded by encampments of small parties of men detached for the purpose.

The Second Paper read was :—

Narrative of a Journey in the Bushman and Namaqualand Districts of the Cape of Good Hope, with Map. By ROBERT MOFFAT, Esq., F.R.G.S., Government Surveyor. (1st Part.)

Communicated by the Right Hon. H. LABOUCHERE, F.R.G.S., H. M. Secretary of State for the Colonies.

[This paper will be printed in full in the Journal.]

THE PRESIDENT.—Our thanks are due to Mr. Moffat for his able memoir, and also to Mr. Labouchere of the Colonial Office for his kindness in communicating it. As the brother-in-law of Mr. Moffat, our valued friend Dr. Livingstone, is present, I will not occupy your time, but at once call upon him to explain what he knows of the region described. Before I do so, however, I must express my sincere gratification at the announcement made by the Chancellor of the Exchequer in the House of Commons, that Her Majesty's Government has decided to give due and becoming aid to Dr. Livingstone, so that he may pursue his researches in Africa, and overcome those difficulties which have hitherto prevented so many travellers from penetrating into the interior of Africa. I may also state that Government has written most explicit instructions to our minister in Portugal, to aid Dr. Livingstone by every means in his power, and to prefer a similar request to the Portuguese Government. I have only to express my hope that the Government will appoint two or three men of science to accompany Dr. Livingstone, and to assist him in developing the natural history and resources of the country, in accordance with wishes long entertained by ourselves, and in compliance with the request of the British Association for the Advancement of Science.

DR. LIVINGSTONE, F.R.G.S.—The first remark that I would make on Mr. Mof-

fat's paper is this, that in such papers as we have heard to-night we see the great value of the Geographical Society. We learn what to avoid, and that is something. In 1852, when I was at the Cape, an enlightened colonial governor sent the Rhadamanthus steamer round to this part of the west coast, in a great hurry, to prevent a reported American vessel sending in gunpowder to the Caffres. I do not know whether any person raised the rumour because he was anxious to get in his own gunpowder on the other or eastern side of the country; but had the governor known what we have heard to-night, he might have scorned the report with—"They might as well attempt to send it to the moon." The captain of the Rhadamanthus, long before the country was known and the chart laid down by Captain Nolloth, went and galloped about, and did not find a single soul, nor anything else. The country was entirely parched up; and as for carrying gunpowder across to the Caffres, why, I defy anybody to carry himself at that particular season. This country is interesting to me, because my father-in-law, Mr. Moffat, lived there forty years ago, near the part called Pella. At that time missions were just beginning. People did not know much about them, and some of the sagacious men of that day thought that "any man who could read a Bible and make a wheelbarrow was fit to be a missionary." Mr. Moffat went out when these principles were current, and his salary was the enormous sum of 25*l.* a year. He proceeded to that part of the country near Pella, and took up his residence in a Caffre mat-hut, with a half-caste Dutchman, named Africaner, a clever man, but a great enemy of the colonists. The huts of the village were situated in a circle, and in the middle of the circle the cattle were kept. Mr. Moffat was sometimes aroused by a pair of bulls getting up during the night to settle their quarrels, one sometimes pushing the other into the hut. All the food he had for nearly two years was milk, zebra meat, or any other wild meat that he could get by his gun. After living that period at Pella, and finding it totally impossible to elevate the people, he set off up the Orange River on horseback, and suffered very great privations. He had no bedding with him, and he and his companions sunk holes in the sand as beds, and covered themselves over with sand. One of the men thought it safer to sleep on the surface, for, said he, a lion might come and disturb them in the night, and those covered with sand could not run off; upon which Mr. Moffat remarked, "A lion will not take a head so long as he can get a body." He succeeded in reaching Griqua Town; and finding a better country, he resolved to establish a mission in the Bechuanaland. He found the country, just as his son, the present Mr. Moffat, junr., had described it, exceedingly arid and difficult to traverse. This being the nature of the country, and the fact being comparatively well known, it is quite marvellous that another colonial governor should pass a gunpowder ordinance, whereby our friends, the Bechuanas, could not get a single ounce of gunpowder to defend themselves against the Boers. The Bechuanas could not attack the colony on that side; this arid country was a sufficient defence, and the Bechuanas had never attempted it, nor been guilty of cattle stealing even. There was a complete barrier against them in the nature of the country, and yet the colonial governor passed a law whereby the colony engaged to prevent ammunition going to them. Yet the Boers, who had been fighting against us, can have as much as they like. We condescend to act as policemen to the Boers, and lose our good name in consequence. In other parts of the country, far to the north, and at least 400 miles in the interior, the English are known as "the friends of the black man;" yet here this poor governor, simply by not being "up in his geography," destroyed the influence of the English name. Mr. Moffat had referred to the Bushman. It is a country just adapted for the Bushmen. The vegetation is capable of sustaining a great deal of drought, and there are numerous tuberous roots on which these people can subsist. Sheep can likewise subsist on those plants during certain parts of the year.

Mr. Moffat refers to certain fountains in calcareous tufa towards the middle of the country. It is found that all these fountains if cut into from a lower level will yield a perennial spring. I have seen farmers, guided by a patch of rushes, begin a deep canal a mile off, and cut up to the rushes, and so get a stream which runs the whole year. Occasionally I have seen them cut into a well that had ceased to flow, and get a constant supply of water. The Boers in the colony are enterprising and industrious, and are developing a trade in wool. Lately, Mr. Salt has sent out twenty alpacas to the Cape, which I have no doubt will succeed well. There is every probability that in the course of time it will become a more flourishing colony.

The Third Paper read was :—

Latest Accounts of the Fate of Dr. Vogel.

Communicated by the Right Hon. the EARL of CLARENDON, K.G., F.R.G.S., Foreign Office.

MY LORD,

Alexandria, October 23, 1857.

I have the honour to acknowledge the receipt of Mr. Hammond's despatch, Consular No. 8 of the 9th ultimo, instructing me to direct the British Vice-Consul at Khartúm to make all possible inquiries as to the fate of Dr. Vogel, the African traveller, and in the event of its being ascertained that Dr. Vogel is in a state of captivity, to authorize the Vice-Consul to adopt the most effectual measures he can devise, and if necessary to offer a ransom, for Dr. Vogel's release.

I immediately transmitted the necessary instructions to Mr. Vice-Consul Petherick at Khartúm; but having since learnt that there is an ambassador from the King of Darfur to the Viceroy of Egypt, now at Cairo, I have, through Mr. Messarra, the Dragoman of this Consulate-General, been in communication with that personage, and I transmit a report of a verbal statement made by the Ambassador of Darfur to Mr. Messarra, which I fear almost places beyond a doubt the reported murder of Dr. Vogel by the King of Wadai.*

I have, &c.,

(Signed)

G. GREEN.

The Earl of Clarendon, &c.

Verbal Statement of SAID MOHAMET SAANGHITI, Ambassador from the King of Darfur to the Viceroy of Egypt.

Cairo, 19th October, 1857.

Before my departure from Darfur I was informed by several persons (natives of Senegal) that three European travellers, under the names of Abdul Carim, Abdul Wahed, and Abdul Samad, had arrived from Bengazi at Fezzan, and from thence to Bornu, where they met Seik Umar, the prince governing that district, who received them very well, and gave them letters of recommendation to the governors of Begharum, Mandara, Adamao, Houssa, and Malla, provinces inde-

* See Proceedings R. G. S., No. I., vol. ii., p. 30.—Ed.

pendent of each other. Abdul Carim, who was the chief, sent Abdul Wahed to the east, that is to say, to Beghami, and other places in that direction; Abdul Samad went towards the south, that is to say, towards Mandara and Adamao; and Abdul Carim in person proceeded towards Houssa and Malla.

Abdul Carim, on leaving Bornu, proceeded to Zandar, where he formed a friendship with a scerif, named Abdul Azig ben Saleh, with whom he left all his money and effects, and departed for Timbuctu, and attempted to enter Malla, where they were inclined to kill him; but he was protected by a man of influence, named Seik el Baccai, of Timbuctu, who escorted him with a number of persons, and enabled him to visit the whole province of Malla, conducted him safe out of the same, and caused him to be escorted by a certain Sed Ahmed Uadawi, and some other eight persons, back to Bornu; where he found that Abdul Rahman had usurped the kingdom of his brother Umar, and had plundered everything, among which were the possessions of the scerif Abdul Aziz; whereupon Abdul Carim demanded of Abdul Rahman that he should restore to him the property he had deposited with that scerif, which was accordingly restored to him. After waiting at Bornu some time for the return of his companions, and not seeing them appear, he departed for Bengazi, or Senegal, to return to his own country, after his great fatigues and perils, having obtained his object, of taking representations of all the most remarkable things, and the most interesting views of the interior of Africa.

Abdul Wahed (Dr. Vogel) departed from Bornu for Bagirmi, where he was well received; and, after having well visited all localities as he wished, he proceeded to Madagu, and from thence passed to Borgu, that is to say, Waday, where he met the vizir of the prince of Wadai, named Simalek, who treated him well. He afterwards entered the interior of that province to the capital city called Wara, where the Prince Sciaraf, so called Sultan of Waday, who is now paralytic, resides; but in the neighbourhood of Wara there is a sacred mountain, the ascent of which is prohibited to all persons. Abdul Wahed, whether informed of this or not, ascended this sacred mountain; and when the prince learnt it, he ordered him to be put to death, and so it was. The intelligence of this reached Darfur about seven months ago. When Mohamet Hassan, King of Darfur, heard it, he was much displeased, and sent to reprove the Prince of Waday, otherwise Borgu.

In respect to the third, *i. e.*, Abdul Samad, nothing has been heard, but neither of these three ever reached Darfur.

DR. BARTH, F.R.G.S.—The statement of that Arab (the messenger of the King of Dár-Fúr) contains accurate information about the routes which we pursued, and even gives correctly the names of those very men who gave me protection. With regard to what is stated about Dr. Vogel's final fate, there is no doubt that he was well received on his arrival at Wará. Whether he went direct from Bornú, or went round the north side of Lake Chad, I do not know; but from the contents of the letter received by H.M.'s Consul at Tripoli from the Sheikh of Borgú, I am inclined to suppose that he took the latter road. At all events, it seems that in the beginning he wanted to avoid Wadáí, because a civil war had been raging there. I recommended him to stay at the capital of Bagirmi, the ruler of which country I had befriended, till a messenger might arrive from the King of Wadáí to take him safely to Wára. But after leaving Bagirmi and visiting the provinces of Fittri and Middogo, he seems to have gone to the north of Wadáí to a place called *Wadi Orádha*, and I suppose the King of Wadáí sent messengers to the place to fetch him. At least such is the statement contained in the letter of the Sheikh of Borgú, in which, however, I do not place implicit confidence. There is certainly a holy hill in Wára, the capital of Wadáí, just over the palace. Wára is enclosed by two hilly chains, on the east and west side, leaving only two narrow entrances, one from the north and the other from the south. The king's palace is on the slope of the eastern chain; and on the top is said to be a holy hut, where every new king must reside for seven days. Whether it be true that Vogel wanted to enter this place, in order to investigate its nature, and was executed for the attempt, as alleged, I do not know, but think rather improbable; although I must say, that I myself at present entertain little hope that the courageous traveller be still alive. It would be a great pity if his interesting journals at least should not be saved. His papers, as far as they were taken home by Corporal Macguire, who is stated to have been slain at the well Belkashi farri, six days' journey from Kuka, if they were not destroyed on the spot, may have got into the hands of some of the chiefs connected with the tribe of the Kél-owí, the inhabitants of the country of Air, although those freebooters who continually infest the road from Bornú to Fezzán do not acknowledge the supremacy of those chiefs. I do not expect that the chief of Bornú will be able to do anything in this respect, because of the Tawárek, who infest those roads, being his greatest enemies. But I think the chiefs of the Kél-owí, through whose territory we passed in going to Negro-land, would be more likely to succeed in endeavouring to get some of them back—provided they were not destroyed on the spot or scattered about. I myself, on my former journey, was robbed, after serious fighting, of all my property; and although this had happened on the border of the territories of the Bashá of Tripoli, and of Mohammed Ali of Egypt, both of whom had secured me their protection, I have seen again neither the smallest scrap of my papers nor any of my things.

Fourth Meeting, Monday, January 11th, 1858.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS.—*Dr. Wm. Camps and the Rev. A. P. Moor were presented on their election.*

ELECTIONS.—*J. H. Baxendale, Esq.; G. Bonner, Esq.; Lord Viscount Bury, M.P.; Lord Claremont; Chichester Fortescue, Esq. M.P.; G. Grote, Esq.; Edward Hertslet, Esq.; Captain Sir Wm. Hoste, Bart., R.N.; Captain*

C. Johnson ; Lord Keane ; J. W. Malby, Esq. ; Ch. P. Serocold, Esq. ; Captain J. Stopford, R.N. ; Anthony W. Twyford, Esq. ; Captain S. Webb ; and James Young, Esq., were elected Fellows.

ACCESSIONS.—Among the more important donations received since the last meeting, were Plans of Lucknow, by the Hon. East India Company and James Wyld, F.R.G.S. ; Fullarton's and Spruner's Atlases ; Admiralty Charts ; Track Surveys of the River Paraguay, by Captain Page, of the United States Navy ; Plan of a portion of the Great Orange River, and Map of Little Namaqualand and Great Bushman Land, by R. Moffat, Esq., F.R.G.S., &c.

The PRESIDENT said : Before we proceed to the ordinary business of the evening, I feel impelled by affection and duty to call attention to the great loss which the scientific world has sustained, and geographers in particular, by the decease of my illustrious friend, Admiral Sir Francis Beaufort. I know it is unusual to allude to deceased individuals except in the anniversary address, and when the occasion for that arrives I will endeavour to do justice to the merits of this great geographer. I now depart from the ordinary custom of the Society that we may pay a *special* mark of respect to the memory of Admiral Beaufort, the perfect type of an English seaman, a disinterested, generous, noble-hearted Englishman, who devoted his whole energies to the advancement of geographical science, who lost no opportunity of serving his friends, and who, above all, was the strenuous and unceasing advocate for the discovery of traces of the expedition of his old and cherished friend, the illustrious navigator Franklin.

I have next the pleasure to state that Lord Clarendon has communicated to us the expression of his wish that the Society should place before his Lordship their suggestions with reference to the proposed expedition of Dr. Livingstone to ascend the Zambesi and explore the interior of Africa. Having brought that subject under the consideration of the Council, I have the satisfaction to state that my associates unanimously approved of all the suggestions which Dr. Livingstone had proposed to Lord Clarendon. Dr. Livingstone explained his whole plan to the Council, and gave in the names of the gentlemen whom he had fixed upon as the most proper to accompany him. It is no breach of confidence to read the names, because they have been approved, not only by the Council of the Society, but also by the Zambesi Committee of the Royal Society. The first is Commander Norman B. Bedingfeld, R.N., F.R.G.S., who is known to geographers especially for his exploration of the Congo. Dr. John Kirk, M.D., F.R.G.S., is proposed to go as the surgeon and economical botanist of the expedition. Possessing a sound knowledge of botany and natural history, he is also a good animal physiologist, and will be able to inquire into the nature of that remarkable insect the *tsetse*, which destroys so many animals in South Africa, and possibly to devise some remedy for this scourge. I may add that Dr. Kirk was recommended by Sir W. Hooker and Dr. Hooker and Dr. Belford. As a mining geologist I have recommended Mr. Richard Thornton, of the Government School of Mines ; and you all know the importance it will be to Dr. Livingstone to be accompanied by a person who can point out to him the real value of ores and minerals during his progress, and test the qualities of coal in that country.

As it is desirable that the artist should be a person thoroughly competent to delineate effectively the features of the country, the expedition is fortunate in having secured the services of Mr. Thomas Baines, F.R.G.S., who has distinguished himself by numerous drawings exhibited in this room, and who is

well known both by his travels in tropical Australia and in South Africa, and who has shown his competency in plan and chart drawing. Dr. Livingstone will farther take out his brother the Rev. Charles Livingstone, as his secretary. Mr. Livingstone is to take charge of the establishment, which it is proposed to fix for a year upon the confluence of the river Kafue with the Zambesi.

I need not tell you that the Council will afford Dr. Livingstone every possible aid as to advice, instruments, and method of observation, so that everything may come before us eventually in a well-digested and graphic form. Lastly, I have to state that the Council has expressed a very decided wish upon one point which they hold to be of the greatest consequence. Considering the well-known unhealthiness of the Zambesi below Tete, the Council urgently recommend to Her Majesty's Government that Dr. Livingstone and his associates be forwarded from the mouth of the river to Tete in a decked steam-vessel of *light* draught with as much celerity as possible, and that the steam-launch now constructing for the exploration of the upper part of the river by our associate Mr. Macgregor Laird be employed to transport the party from that point upwards only.

The Papers read were—

1. *Extracts of Reports from the Niger Expedition.* By DR. WM. B. BAIKIE, R.N., F.R.G.S., and MR. D. T. MAY, R.N., F.R.G.S.

Communicated by the Right Hon. the Earl of CLARENDON, K.G., F.R.G.S.,
H.M. Secretary for Foreign Affairs.

Dayspring, off Rábba, 28th Sept. 1857.

MY LORD,—As I expect in a very few days to be able to forward letters and despatches to England, through the Yóruba country and Lagos, I shall draw up for your Lordship's information an account of the proceedings of the Niger Expedition up to the present time.

At the date of my last despatch (No. 7, 7th July) we were just on the point of leaving the Brass River, and crossing to the Nun by a creek which I had the day previously caused to be examined. For a vessel of the size and draught of the Dayspring there is at all times sufficient water; but the schooner we had in tow being larger and deeper, she grounded several times, and we had to wait for two successive flood-tides before we could get her off. We spent altogether 28 hours in this gloomy mangrove creek, which is in some places not more than 30 yards wide. During the night we passed there we were nearly literally devoured by the myriads of mosquitoes which swarmed around while we lay aground. I took advantage of the time to examine in our boats some other portions of the network of muddy creeks which, as far as we went, were laid on our chart, and I got a native, who was induced to come on board, to spend the forenoon in giving to the Rev. Mr. Taylor of the Church Missionary Society a few specimens

of the Brass or Nímbe dialect, which is, as yet, almost unknown to philologists.

We took our farewell of the sea and commenced our ascent of the Niger proper at daylight on the 10th of July, and proceeded through the delta at rather a slow rate, partly on account of numerous stoppages, but chiefly retarded by having to tow a heavy vessel against a strong current. I communicated with all the larger and with most of the smaller towns and villages in the Delta, endeavouring to establish friendly relations with the chiefs and people; announcing to them the views of Her Majesty's Government, and warning them against any hostile or predatory acts on their part, and was always successful in making friends with them. They invariably promised to behave properly towards white men, and to commence proper trade with them. At some places where Europeans had never previously stopped there was sometimes a little suspicion on the part of the inhabitants, but in such cases my practice was to land with only two or three companions, and to assuage their fears. In one or two places they met us on the shore armed, but this was not with any hostile view, but only as a matter of precaution, to be ready for any emergency. The product of this tract of country, extending along the river for upwards of 100 miles, is palm oil, the supply of which is very abundant, but which might, were the demand for it carried to their own doors, be very greatly augmented.

On July 20th we anchored off the town of Abó, which may be considered as the extreme apex of the delta, and at this populous and important place we delayed for three days, making arrangements with the chiefs and people, who are very much disposed to be friendly: indeed, our only difficulty arose from the extremely grasping character of one of the chiefs, who was unwilling that any other district should benefit from our arrival except his own.

We called at several other large towns in this, which is the Igbo (pronounced Iho) country, and at one, named Onitshá, about 150 miles from the sea, we remained a week to enable the master of the steamer to erect a trading-house, and where we also made our first missionary establishment. This town had never before been visited by Europeans; but we easily secured the confidence of the people, and, on my asking from their king ground for our purposes, it was readily granted. Here also I left three men, who had accompanied me from Sierra Leone as settlers; they being either Igbo or of Igbo descent, and who thus formed the beginning of an immigration of liberated Africans from Sierra Leone into these their native lands. This town, Onitshá, is well placed on rising ground with a dry soil: it is the key also along the river to the extensive Igbo

districts, and is the proper spot for a trading nucleus; on these grounds I recommended it, and it will doubtless be retained as a missionary establishment, though whether as a trading post I cannot say. The principal productions of Igbo are palm-oil and red wood. Cotton is grown for their own use, and might, if due encouragement were offered, be largely produced.

We next entered upon the Igára country, and on the 4th of August reached a large creek that had not been previously examined, and which we descended in our boat as far as time would allow. On the 5th we reached the capital, Iddá, where we found that the attá, or king, who reigned when I was in the Niger in 1854, was lately dead; but we saw his successor, a man of more pleasing manners and appearance than his predecessor, who readily renewed all former engagements with us, and who with all around him behaved in a very friendly way towards us. At Iddá I met a former acquaintance, Ama-aboko, chief at the confluence, who, being in a manner a dependant of Igára, was then attending the election of the new king. As formerly, he was extremely friendly, sent to his eldest son, who was acting in his absence, desiring him to assist us far as he could, and he sent with me one of his own attendants, to tell us the names of towns we might pass, and to introduce us at various places where we might visit. Igára yields a little palm-oil, some ivory, and cotton of good quality; but during the unpopular sway of the late attá, Igára lost many of her best people, who removed to other districts.

On the 10th of August we anchored at the confluence of the Chadda and the Niger, and on my landing at Ghébe, or Igbébe, I was at once recognised and met with a very warm reception. The authorities at once gave us, on my asking them, ground both for a factory and for a missionary establishment, allowing us to select our own sites. Here most of us possess the confidence of the people so entirely, that I believe Mr. Crowther or myself could induce them to do anything we chose, within the bounds of reason. The inhabitants are much more civilized than any met with near the sea; they are quite devoted to trade, and under due guidance might soon be greatly improved.

I remained in this neighbourhood until the 27th of August, partly to advance, as far as I could, the settlement of traders ashore and to see the missionary establishment fairly started, and partly also to complete the triangulation of the hilly district which is characteristic of this region, and which, under the able conduct of Lieut. Glover, rapidly advanced towards completion. At the confluence we left the schooner George, which had been with some difficulty towed up

the river, and we also left Captain Alex. Grant, the sailing master, who was desirous of superintending his trading post.

On the 27th of August we left the confluence and entered the main stream of the Niger; and as there was plenty of water, we got on without difficulty, visiting all the larger towns, laying down the districts and countries, and, whenever practicable, ascending the hills for surveying purposes. At the large town of Egau (Egga of the charts), which was the farthest point reached by Captain Trotter in 1841, we remained for some days on very friendly terms with the people; this being the commencement of the extensive and important kingdom of Núfi (often Núpi), we were constantly referred to the king Assúmo Záki, who had just returned to his domains after an exile of twelve years, during which this unhappy country had been in a state of anarchy and confusion. The various rivals had been at length reconciled, and the two principal ones, viz. the king and his half-brother Dásabá, were living together. Very shortly afterwards, the news of our being in the river having reached the king, we were met by messengers from himself and his brothers, inviting me to visit him. We found on inquiry that they were residing at a temporary encampment, said to be near the banks of a small tributary stream, which we accordingly sought for, and ascended against a rapid current for about 15 miles to a small village, whither horses were sent for myself and party. A ride of about 14 miles through a fine but mild country brought us to the encampment, which had quite the appearance of a town, only that the huts, being temporary, were entirely constructed of straw, while the population, including women and children, could not be under 60,000; it was a finely chosen spot, although they had been induced to encamp there partly by accident, as the final battle in which their last opponent had been defeated and slain had taken place in this neighbourhood about three months previously. We were received most kindly and hospitably by all, and I spent nearly two days in the place visiting and making friends with all the principal people. The king himself and his half-brother Dásabá, who is a very intelligent person and really the working man, were most kind, and during our stay we were feasted on, to us, the luxuries of milk, butter, and honey. Being, next to the Sultan of Sókoto, the most powerful chief in this part of Central Africa, I did all I could to cement a friendship, and made to all those of importance, or to those who showed civility towards us, such presents as I considered suitable. We next returned to the ship with no farther inconvenience than having to wade breast high after dark along a narrow muddy creek, which by the rise of the waters had become filled,

and intervened between the bank of the river and our road. It is the intention of the king and his friends, as soon as the dry season commences, to return to the town of Rábba and rebuild it, as it has now been a mass of ruins since he was defeated and driven away in 1844 or 1845.

Since we left the king's encampment at Bida we have continued our ascent, and on the 18th we reached Rábba. Here I have since remained to enable us to get our boilers and engines cleaned, some needful repairs completed, and a supply of wood obtained. We have also taken advantage of the time to rerate our chronometers, to fix the town accurately, and to prepare and finish despatches and tracings of our work for sending to England, and I have now on board a messenger kindly sent with us by the king of Núfi and Dásabá to carry our despatches to Hónu, as the two brothers possess considerable influence in the Jóruba country. I believe that with their aid there will be very little difficulty, if any, experienced in opening up a safe road from Lagos through the Jóruba country to Rábba, and establishing a regular postal communication; Rábba being also on the regular caravan route.

When our despatches shall have been forwarded it is my intention to continue the ascent of the river to endeavour to ascertain the navigability of the rocky channel said to exist below Búsa, during November to return to the confluence to meet the steamer then expected from England, by which I hope to receive some fresh chronometers and supplies of stationery, and then in December to return to Rábba for the purpose of making our journey to Sókoto, which is now impracticable from the state of the roads and weather, most of the low country being flooded, and severe tornadoes with thunder and tremendous falls of rain being almost of daily occurrence: another reason which will oblige us to return is to obtain provisions.

Our work hitherto may be summed up thus:—From the mouth of the Brass up to this spot a new and very accurate chart has been laid down, containing numerous corrections on those previously done, especially between the confluence and Rábba. The soundings taken have been very numerous, and we have examined many channels before untried, and our survey of any rocky passages has always been particularly careful. We have also ascertained the existence of six or seven tributary streams previously unknown, have ascended one of them, and hope to be able to examine others.

Our health continues fair; all, from frequent exposure, have had attacks of fever, but not of undue severity, and at this moment we are well. Of the ship's company I cannot say so much, illness

having been more rife among them and more troublesome in its effects, and I regret to say that among them one death has occurred.

We have now been 87 days in the river, and are, as far as the Government party is concerned, as ready for work as the day we left the sea: such points as require alteration I shall mention in a separate despatch.

This morning we felt it chilly, with the thermometer at 76° , though in the afternoon it will probably be close and roasting, with a heat of from 93° to 96° in the shade; two days ago the range extended from 72.5° to 98° , and in the sun ashore we have experienced it as high as 149° .

I have, &c.,

W. B. BAIKIE,

In charge of the Niger Expedition.

The Right Hon. the Earl of Clarendon.

Encampment near Jéba, 29th Oct. 1857.

MY LORD,—It is with much regret that I have to transmit to your Lordship information of the loss of the expedition steamer Dayspring, on a sunken rock near this place, on the forenoon of the 7th October. The Dayspring left Rábba on the afternoon of the 6th October, continuing her ascent the following morning, in the course of which she left the flat alluvial country which had long prevailed, and entered on a totally different region, the banks becoming stony, rocks showing in the river, and hills and mountains appearing ahead. About 10 o'clock we reached a place where a huge precipitous rock, some 250 feet high, divided the river into two nearly equal channels. We inquired of a man whom we had shipped as a pilot at Rábba which channel to take, and followed his advice; but on clearing this we found the river again divided into several passages, through the largest of which the water was rushing impetuously at a rate of about six knots. We accordingly anchored, and Lieutenant Glover went in the gig to sound and examine the river.

One channel, in which the current did not exceed five knots, and of a breadth of about sixty yards, was found to be free from rocks from side to side, and to have a depth of three fathoms. This we accordingly determined to try, some natives in a canoe alongside saying also that the passage was clear. In approaching it, however, we were obliged, on account of the direction of the current, to keep close to a rock on our left-hand side, on which, being caught by a

strong eddy, we were first thrown, but without receiving any damage.

On clearing this we entered the passage, where the current caught us on the port bow, driving us towards the opposite side, and making the vessel steer very badly; and scarcely had she commenced to obey the helm, which was hard a-starboard, than the current, now catching us on the quarter, and before we were quite clear, threw us with great violence on a sunken rock, jerking the leadsman overboard.

On our trying to get the vessel off, the after part remained fixed, while the steamer heeled over so much as to give us the idea that she was about to slip broadside off.

After the first excitement passed away, we all began to suffer from fatigue, exposure, and sleeping near the swamp, and we have all had attacks of fever more or less severe,—Lieutenant Glover, Mr. Davis, and myself, being the most sharply seized. My assistant, Mr. Dalton, who had been very ill previously, had a relapse of dysentery, and was very dangerously ill, but now, happily, all are either convalescent or well. Our canvas tent being extremely hot during the forenoon, the thermometer standing in it, when freely suspended, at from 95° to $99^{\circ} \cdot 5$ F., we got bamboos and mats from the natives, and constructed a more comfortable residence, about 40 feet long by 25 broad, and 16 feet high. Our encampment is the wonder of the natives, as we have cleared a considerable space of ground, have our tents well removed from each other, and keep the roads and ground clean. Taken altogether, it is a very good site, as, although we have a swamp not very far off, the wind never blows from that direction, and the health of all is improving.

I have sent to the king of Núfi to ask him for a couple of canoes to send a few of our most useless hands to the confluence, and at the same time to hurry up Mr. Laird's other steamer, which will be due in the river very shortly, and until she comes up we must content ourselves here, not having the means of transporting so many persons, and as I am also unwilling to risk their health so far. We have saved enough of damaged goods to enable us to buy provisions from the natives for some time to come; and, though we have neither salt meat, biscuit, sugar, coffee, cocoa, nor wine, and only a very small quantity of tea, flour, rice, salt, and rum, yet we procure daily fowls, yams, pumpkins, corn, and occasionally a goat or a little honey.

We managed to save almost the whole of the Government instruments, including all the chronometers, but most of our stationery is gone. Of our large botanical collection, Mr. Barter saved only a

part, and that damaged; but, by great exertion since, he has again put them into fair condition, and he is hard at work trying to replace his specimens as far as this neighbourhood will allow. I have especially to lament the destruction of a great part of Lieutenant Glover's surveying work, the portfolio containing which, after having been placed in what seemed a secure place on deck, was by the heeling of the ship thrown overboard and totally lost.

I have great satisfaction in being able to express my entire approbation of the conduct of the officers serving under me, both during and since the wreck.

I have, &c.,

WILLIAM B. BAIKIE,
In charge of the Niger Expedition.

The Right Hon. the Earl of Clarendon.

Clarence, Fernando Po, Nov. 24th, 1857.

MY LORD,—I have the honour to report to your Lordship my arrival at this place yesterday morning, per Mail S. S. Candace, from Lagos.

In pursuance of Dr. Baikie's instructions to me of the 31st October, 1857—a copy of which I have the honour to enclose—I left the encampment near Jéba, with two native attendants and messenger, about 3 P.M. of the same day, arriving at Fangan, a small town on the right bank of the Niger, situated midway between the encampment and Rábba, about 8 miles' distance from each, where I passed the night. At Fangan a small tributary, the "Osin," falls into the Niger, which I subsequently crossed, when but five hours' walk short of "Ilorin," where it was a river 30 yards broad, rapid, and just fordable for horses: it is not navigable for canoes from this point to the Niger in consequence of fallen trees and obstructing rocks.

On the following morning, Sunday, 1st November, I left Fangan, and walked continuously until past five in the evening, when I reached a town "Kpandáragi," where I rested for the night. The walk extended over 26 miles, during which we passed the three inconsiderable towns of Banyagífa, Koagír, and Gurúfu. Previously to reaching the first, the road had lain through almost continuous swamps, such as are common to the vicinity of the river at this season of high water.

After leaving it the roads improved, and we entered higher and drier country.

Leaving Kpandáragi the following morning (the 2nd instant),

three hours' walk brought me within the boundary of the Yóruba country, and at a very large and most important town, called Saré, when, after an interview with the chief, second in actual, but first in executive authority, whose title is Balogon, or war chief, I was furnished with comfortable quarters, and with what pleased me equally, assurances of their pleasure at my visit, and willingness to forward me on my journey. Saré is a large and important Yóruba town, several miles in circumference, and it was impossible for me either to attempt a measurement or obtain reliable information during the few hours I remained there. The inhabitants are Mohammedan, and up to the time of my visit the town was unvisited and almost unknown to Europeans.

Towards the close of the day I was summoned to a more social interview with the Balogon, at a large piazza full of inferior chiefs, when I enjoyed a very lengthened conversation, affording me an opportunity of publicly explaining the objects and intentions of white men in visiting their country, our arts and manufactures, our numerous useful discoveries, our sentiments upon the slave trade, our social laws and customs, and many other subjects, which were received and understood in a manner and to an extent which surprised me. The chief promised that a horse and a messenger should be both ready for me at an early hour in the morning.

Dr. Baikie could only furnish me with two inconsiderable presents for the chiefs at Ilorin; so that, on quitting Saré the following morning, I had nothing to offer but apologies and explanations, which were better received than I had a right to expect; and the Balogon having requested that a pair of pistols might be brought to him on my return, Consul Campbell at Lagos has undertaken to procure them if possible, and, if unable, to send him some other suitable present.

To-day's travel—the 3rd instant—was about 20 miles, terminating at half-past 5 at the town of "Osin," on the left bank of the tributary of that name previously mentioned, during which I passed two towns, "Akpádo" and "Kpáni," the road throughout lying either through well-wooded ridges or hills, or crossing numerous small streams; the ground in the higher parts strong and bad, with ironstone, granite, or a conglomerate of quartz and mica predominating, and in the lower parts level and sandy.

I left "Osin" before daylight on the morning of the 4th, passed the considerable towns Keyi and Okanshi, and, after with some difficulty crossing the Unyu and the Aza, two branches of a considerable tributary, said to fall into the Niger at Sangan, arrived at Ilorin at noon.

Ilorin, situated on a slope two or three miles south of the conspi-

cuous and isolated conical mountain of Sobi, is an independent town, and the stronghold of Mohammedanism in the Yóruba country. At 10 P.M. I was admitted to a private interview with the Balogon,—my attendant interpreter, Asímo Zákí's messenger, he, and myself alone being present, and the piazza kept quite dark, excepting a dull light thrown only on the mat on which I sat. I fully explained my objects, wishes, and intentions, as instructed by Dr. Baikie. My reception was everything I could have wished, and I was to be presented to the king on the next day. The following day was one of vexatious delay to me; the king was too busy to see me; and, until a stranger has seen him, he is a prisoner, not being permitted to go beyond the premises allotted to him.

On the 6th I was received by the king, chiefs, and head men, with much formality. The king himself I never saw: a moving mass of silk and satin on similar cushions, at a hole in the wall, nearer to which than several yards I was not allowed to approach, was nevertheless him. As it had been hinted to me that the presents were paltry, I took this opportunity of explaining the circumstances of our inability to offer more suitable ones. About five months previous to my visit a party of three American missionaries had visited Ilorin, only one of whom saw the king, and no permission could be obtained to proceed beyond into Núfi. The king told me of this visit, and, on asking me if they were friends of mine, I took the opportunity of more fully introducing myself as a messenger from the British Government, sent to assure Africans of our desire to know and befriend them, to supply them with those things which we possess and which they so much covet, of our need of those things which their country so plentifully produces, pointed out our abhorrence of slavery, and to the utmost of my ability dilated upon those matters which I conceived our duty as Englishmen and Christians points out to us, and which are quite in accordance with the wishes of your Lordship and Her Majesty's Government in creating this expedition. The king made me a present of a sheep and several thousand cowries, and, after repeated expressions of satisfaction at my visit, my objects, my explanations, &c., the ceremonious and public interview ended.

I was now at liberty to move about the town, but my anxiety to forward arrangements for my departure prevented me entirely availing myself of it. The population of these large towns in Yóruba is by no means to be estimated from the extent of ground on which they stand; they are invariably walled and ditched, and within, though clusters of compounds or series of dwellings are numerous, much the most considerable space is occupied by isolated ones, situated in plots about as extensive as one of the smaller

metropolitan parks. The estimation I obtained from some of the principal men as to the circumference of Ilorin was between "five days' walk" and "five days' hard riding with a very fast horse." I now sought an early interview with the Balogon, obtained from him the mails, which were left at Ilorin nearly a month previously, and pressed upon him my speedy departure. He assured me of his intention of looking for a horse for me "to-morrow," so that I might start the next day. He strongly impressed upon me his great desire to have a tent or some canvas to make a house for his use on war expeditions, which I have strongly recommended to Dr. Baikie.

About 4 P.M. on Sunday, 8th November, 1857, provided with a tolerable horse and two messengers in addition to my own party, I left Ilorin, having at the last moment, at the request of the Balogon, illustrated the advantages and effects of my five-barrelled revolver, which filled him and the crowd with astonishment and delight, and of course elicited the request that when I came back I would bring one similar for him.

The invariable mode of travelling between Ilorin and Ogbómosho (Ibomasha), my next town, is to leave the former at this hour, reaching a farm or small village just before dark. Here I learnt that my horse could not be permitted to pass without a special messenger from the king authorising it. Whilst hundreds were setting out the next morning on the long day's journey to Ogbómosho, I was thus detained until noon, and by 7 P.M. had not reached my destination, and was compelled to halt in the bush. A ludicrous instance of African hospitality which occurred to me here will more clearly show the kindly feelings of the people of this country than I should be able to explain. After settling ourselves on the roadside under some trees, our voices attracted the attention of a farmer and his family in the vicinity, who, approaching us and discovering who we were, soon offered us such accommodation as the farmhouse a little way off afforded. We accepted, and, after a tedious walk, arrived at it, and were furnished with a mat, and afterwards with a portion of food, by which time I discovered that the ground was still to be our couch and the sky our canopy, as the hut was no larger than necessary for their own accommodation. At 4 A.M. on the morning of the 10th I left this hospitable abode, and, after meeting a fresh horse and messengers sent to me by Mr. Clarke, the resident American missionary, arrived soon after 6 at Ogbómosho.

Accompanied by my messengers, I soon sought an official interview with the chief, was introduced, and repeated my explanations, &c., and after a friendly reception was promised an answer "to-morrow." Mr. Bowen, an American Baptist missionary, who after very many obstacles penetrated to this place and established a mis-

sion, has returned to the United States, and published a work containing a much more detailed account of this place, and the country between it and Abbeokuta, than my hasty journey could possibly afford me the opportunity of doing. On the following day a message reached me from the king that a horse would be ready for me; but on subsequently visiting him to bid him "good bye," I learnt that a horse could not be provided, but that I should have some men to carry me in a hammock.

It affords me great pleasure to mention the kind assistance I experienced at the hands of the Rev. Mr. Clarke, who, in addition to his hospitality to myself, furnished me with a supply of stores, of which Dr. Baikie and party stood in great need, and which I forwarded to them.

It was noon of the 12th when I left the south gate of Ogbómosho, accompanied by carriers, messengers, and suite, and arrived at 3 P.M. at a halting-place, where our party wished to stop for the night, as the next could not be reached before dark. I was by this time growing alarmed at the prospect of missing the mail steamer due at Lagos on the 20th, and would not hear of this delay. I then moved the party on, much against their will, accomplished a good deal of our journey in the cooler part of the day, and halted at dark in the bush for the night. On the morning of the 13th we started again at 5.30, and at 7 crossed the "Obba" river, which was then fordable; and after a toilsome journey, sometimes walking and sometimes being carried, arrived at the north gate of "Awyaw" at noon.

"Awyaw" (Aggo Oja), the capital of Yóruba, ranks, however, in point of size only in the second class, with Ogbómosho and Ijaye, &c., and is the least interesting town I passed through. Perceiving that the interval between this and the 20th would not admit of such delays as I had been subjected to, I determined, if necessary, to decline the aid and cognizance of chiefs from this point. I speedily had an interview with the chief, who, it appears, is privileged to receive white men, and made the usual explanations to him, coupled, however, with an intimation that, although I much desired such assistance as I had received at other towns, I could not possibly prolong my stay beyond next day morning. This chief was very civil to me, and my story, &c., was duly carried to the king, who sent to tell me that he had looked for a horse for me, but had failed to find one, and that he could not procure men to carry me. There are no resident European missionaries at "Awyaw," but a native convert is usefully engaged there on behalf of the Church Missionary Society.

At 9 A.M. on the 14th instant, having taken leave of the chief to

whom I had been introduced, and by whom I had been provided with a house, &c., I left "Awyaw," he having explained to me that there was no impediment to my doing so on the king's part, since, indeed, it was quite customary for white men to come and go as they chose. An hour's walk brought me to a small town, "Ilara," and at half-past one I reached a still smaller one, "Iron." After a farther walk for about two hours I was fortunately met by a horse sent from the Church Missionary Catechists in charge at "Ijaye," arrangements which I had made to that effect having succeeded; and by this means I was enabled to reach the Church Missionary premises in that place after five in the evening. This is the station of the Rev. Mr. Mann, of that Society, who, however, was now in Europe: there is here also an American Baptist Mission. My two attendants being much fatigued, I resolved to wait at this place the following day (Sunday, 15th). From "Ijaye" to "Abbeokuta" the journey may be performed in three ordinary days, or, by a new road recently formed, in two days' long journey. I adopted the latter, and provided, by the kindness of Mr. Phillips, with a pony, I set out on the morning of the 16th of November, and reached a halting-place about 9 miles from this point. The nature of the country through which I travelled completely changed: whereas before it had been by tolerable roads, through fine, open, cultivated, or lightly wooded and park-looking country, with views in every direction for miles, I now entered upon a wretched road, extending for many miles through sombre forests, and with a view never extending beyond the trees immediately lining the road, or the grass, 20 feet in height, touching me on each side. After noon we halted on the site of an old town, "Ido," clearly traceable by pottery or vestiges of walls, &c.—one of the numerous examples there are to be seen of the effects of the wars which desolated Yóruba not many years since. At 5 p.m. our day's journey ended by our arriving at a small town called "Ilirgun," which is indeed nothing but a resting-place, with houses of temporary and rude construction for the shelter of travellers, but was once a large and flourishing town. Its re-establishment is however anticipated, aided by the importance attaching to it since the new route has passed through it. I left Ilirgun at an early hour on the following morning (17th November, 1857), prepared for the longer of the two long days' journey, and arrived, after continuous travel, at "Atade," a very small town, about four hours' journey from Abbeokuta. My two attendants, who latterly failed much in their walking, more perhaps in consequence of their being unaccustomed to it, and the roads growing worse, than from actual fatigue (for our intervals of rest were frequent, and sometimes, as at Ilorin, much too long),

now complained very much, and the consequences were that a four hours' journey occupied just six, so that it was 6 P.M. when I arrived at Abbeokuta at the Church Missionary premises, and was most hospitably received by the Rev. Henry Townsend. I had proposed, and, on its being recommended, determined to pursue my journey hence per canoe down the "Ogun" to Lagos (a two days' journey), although there is a land route which occupies but a little more time, and is, of course, more used coming up. Four P.M. of the following day (10th) being selected as a judicious hour for my departure, I had opportunity in the interval of paying a visit to the chief of this considerable place. At 4 P.M. of the 18th I embarked in a canoe at Abbeokuta, it having been distinctly arranged with its proprietor and paddlers that they were to travel all night, and not stop until reaching Lagos. In spite of this, however, three separate times during the night they stopped and made the canoe fast, and it was only by exercising something stronger than eloquence that I could get them to proceed. Indeed, on the third occasion I left them on the shore, and proceeded without them down the river, which had the effect of bringing them in haste after me, and prevented future attempts to delay. After journeying in this way thirty-seven hours, which would have been unpleasant but that the rest it afforded was much relished by all of us, I arrived at Lagos on the morning of the 20th instant, and was kindly received by Mr. Consul Campbell. Four hours afterwards the mail steamship Candace from England arrived in sight, thus showing that my haste had been far from unnecessary.

Thus, accompanied by two native attendants, I have accomplished the journey from Dr. Baikie's encampment on the Niger to the sea at Lagos in twenty days, having travelled over near 300 miles of country, sometimes on foot, sometimes on horseback, opening up the part of that route which has hitherto proved inaccessible to Europeans through the jealousy and caution of the rulers at Ilorin.

From the river to Abbeokuta certainly three-quarters of the whole country through which I passed was under cultivation, corn being the almost invariable article cultivated, which forms the staple, and, with yams, the sole food of the people. The grain was of three kinds—common Indian corn, and the two sorts known to us as "Dawa" and "Gero." Nor was this the only evidence of the industry of this country, as everywhere cotton spinning and weaving are carried on. Yóruba is famous for its cloths. The iron-smelting and pottery works are by no means despicable, and other useful employments are to be witnessed; whilst from town to town for many miles, and particularly to and from "Saré," the entire road presents a continuous file of men, women, and children,

carrying articles of their production for barter or sale. Palm-oil and cotton, of course, find their way to the sea, and will serve to account for the peculiarly brightening prospects recently observable in the trade in the latter article at Abbeokuta and Lagos.

Being unprovided with a barometer, I was unable to make observations on the various elevations, but on leaving the river we speedily gained high ground, and continued to do so until reaching Ogbómosho, which I place as the culminating point. From it to Abbeokuta there is a descent. At this point we reach the delta of the Ogun.

I was furnished with three pocket-chronometers, one of which stopped on the day of my departure, and, as I soon discovered, repeated the same whenever I attempted to carry it in my belt; but with the other two, and the various astronomical observations I have made, I hope to produce an amended chart of this part of Yóruba.

Throughout the entire route I have experienced the utmost civility and often kindness from every native. To the Rev. Mr. Townsend, of the Church Missionary Society at Abbeokuta, I am much indebted for his kindness and assistance.

On my arrival at Lagos I ascertained that Mr. Laird's expected second steamer was preparing for her voyage at the time of the departure of the Candace from England, and might in two or three weeks be expected on the coast. In accordance, therefore, with Dr. Baikie's instructions, I left my two attendants in the care of Consul Campbell, to return on the 23rd instant, carrying the despatches for Dr. Baikie, which were received from the Fernando Po mail-bag in the Candace, together with various small supplies for Dr. Baikie, and a few small presents, &c. The mails and a tracing of Lieutenant Glover's charts of the river I duly delivered to Mr. Campbell for transmission to your Lordship's office, and, taking a passage in the Candace, arrived at this place as before-mentioned.

I am at present the guest of Governor Lynslager, on whose zealous assistance, coupled with that of Consul Hutchinsonson, I may safely rely in facilitating the departure at least of the Sunbeam from this place for the river.

Trusting that my manner of carrying out the business intrusted to me by Dr. Baikie, as well as the various opinions I have ventured to express in this despatch, may meet your Lordship's approval,

I have the honour to be, &c.,

DANIEL J. MAY, R.N.

The Right Hon. the Earl of Clarendon.

Extract of Dr. BAIKIE'S Despatch to the Earl of CLARENDON.

Dated December 12, 1857.

“ I have much pleasure in recording the proceedings of my own party. In a few days I shall expect to see Mr. May on his return from Lagos, after having successfully opened and restored the route from this to the sea. Lieutenant Glover, with another party, has ascended the river from this spot by boat, and having gone some distance beyond that reached by the late Mr. Beecroft, and having passed the so-called ‘ Iron Gates,’ he at length reached a spot, at a Núfi town named Wúru, where, from the very rocky nature of the channel and the extreme force and rapidity of the current, all passage, either by boat or canoe, was impracticable. There he landed on the right bank, in the kingdom of Borgu, and proceeded by land by special invitation to the large town of Wáwa, where were waiting messengers from the important town of Busa, to which place he will next direct his steps. I heard from him two days ago, reporting his progress and asking for further supplies, his letter being dated the 7th inst., a day’s journey from Wáwa; and before his return, which will probably be towards the end of the month, I hope he will have done much towards exploring a rich and little known country, and in which he and his people have been most kindly received.”

THE PRESIDENT.—The Society will be happy to learn that the Admiralty have at once ordered out the Sunbeam, Mr. M. Laird’s new vessel, to proceed to the Niger and relieve the expedition.

DR. MCWILLIAM, M.D.—I must express my admiration at the perseverance and industry with which Dr. Baikie has so far accomplished his mission. It is very much to be regretted that, after getting above Rábba, and escaping many difficulties, the vessel was lost. It evidently got upon one of those rocks where, about twenty miles farther up, the illustrious traveller Mungo Park lost his life. The former expedition by Dr. Baikie, and this expedition, redound very much to his honour, and I shall augur very favourably of any further effort he may make in the Sunbeam. I know Dr. Baikie well, and I have great confidence in his abilities, skill, and zeal.

The only improvement is the more liberal administration of quinine, which may do much, both as regards the prevention and treatment of the African fever; but the main secret in such an enterprise is, I imagine, to employ native agency as much as possible, to have a vessel with ample room, to avoid crowding Europeans together, and to pass as rapidly as practicable through the delta. In the expedition of Captain Trotter, of which I was principal medical officer, out of 132 blacks 11 only were attacked by fever, and none died. Those attacked had all for some years been in England—a fact tending to show that the immunity from endemic disease in warm countries which is enjoyed by the dark races is, to a certain extent, destroyed by a temporary residence in another climate. Of 108 negroes entered at Sierra Leone not one was attacked.

DR. BARTH, F.R.G.S.—It is an important circumstance that Rábbá has always been a great centre of intercourse for the whole commerce of the Niger and the country to the east and west. In the time of the expedition of Captain Clapperton the province of Núpe or Nyffi was in a turbulent state, and the gallant traveller had great difficulty in traversing it in his journey to Sókotu. 'Othmán Zákí, the former governor of that province, was living in retirement in the Birnin Kebbi at the time of my journey, and behaved very friendly towards me. Now that that governor has returned from his exile, and intends to rebuild Rábbá, it is to be hoped that Dr. Baikie will find the country in a better state, and that intercourse with the whole region may be now fairly established. It must, however, be borne in mind, that the Director of the Niger Expedition has to deal with two different chiefs, namely, that of Sókotu, and the other, almost equally powerful, who resides in Gando, four days south-west of the former, and to whom the provinces on the Niger especially belong. Even if Dr. Baikie had not lost the Dayspring, he would not have been able to get to Sókotu at the time, because the whole country between the Niger and Sókotu is quite impassable in September and October; so that if he is able to resume his journey now, he will only have lost two months, as he could not have gone on before November. It is certainly unfavourable that he should have lost the whole of his presents, for without presents he will find a difficulty in proceeding into the interior, and those chiefs always want some presents, especially the people composing the court of Sókotu and Wurno; but it is very favourable in this respect, that some presents have been forwarded by the Earl of Clarendon to 'Alíyú, the present Emeer el Múmencen, who resides at Wurno, along the northern route, by way of Tripoli and the country of the Tawárek.

CAPTAIN WILLIAM ALLEN, R.N., F.R.G.S.—It is twenty-five years since I was in that part of the Niger alluded to. In the survey which I made of the river I was totally unaided, and it was, no doubt, imperfect; nevertheless, I may say that the succeeding expedition under Captain Trotter was safely guided by it. Subsequent surveys have been made with better means and opportunities, therefore I cannot add any information on the subject; but I am glad to find that the results of the recent ascents of the river have confirmed my original suggestion that the rainy season is the most favourable for navigating the Niger, that is to say, the latter end of June or the first week of July. The river is then beginning to rise; the dangers, especially the rocks, can be seen and avoided; and in the event of a vessel grounding on a sand-bank, the swelling flood would soon lift her off. The climate is then more healthy, as the remains of decayed vegetable matter have been dissipated in the dry season. The two first expeditions were delayed by various causes, and could not enter the river until near the time of the periodical inundation, which is the main cause of its unhealthiness. On both occasions our crews were attacked by fevers on passing the delta. In the second season of Lander's Expedition, 1833, we left Rábbá at this time, namely, when the river was full and had begun to fall. This was precisely the time, to a day, that Dr. Baikie attempted to pass the rapids above that city, when the rocks were covered, the channel concealed, and the current was running with the greatest rapidity.

Captain Beecroft, in the *Ethiope* steamer, tried this passage at a similar time, and found the current so strong that, although perhaps going at a greater speed, the vessel made no progress. The reason was, that she was opposed to an inclined plane, up which the paddles had not power to lift her: they only made their revolutions *through* the water. I fear this rapid will be found to be an impassable barrier.

In the Admiralty chart of Dr. Baikie's explorations, now exhibited to the Society, I observe a river was explored, the mouth of which I passed and laid

down in my survey. It was called the Kudunia by Lander, and appears to come from the mountains to the north-east of Kattam Karafi. It may be one of the streams crossed by that enterprising traveller on his way from Zegzeg to Jacoba, when he was carried back, and obliged to return to the sea at Badagry, by his former route with Captain Clapperton, R.N.

MR. GALTON, F.R.G.S.—Does Captain Allen corroborate the remark of Dr. Baikie as to the great improvement in the type of the African as you go inland?

CAPTAIN ALLEN.—I cannot say that I found much physical improvement, though, in civilization, the tribes on the coast are far surpassed by those of the interior. I met with two remarkable instances of tact and courtesy: one was the king of the Filalahs at Rábba; the other a judge at the town of Iddah; neither of them had seen white men before. Nevertheless, in other parts inland I found tribes in a very low condition.

The PRESIDENT.—Before I quit the subject of Africa, I beg to call attention to the sketch on the wall, made by Mr. Baines, the artist to the expedition, of the steam launch in course of construction for Dr. Livingstone's expedition up the Zambesi. As I see Captain Bedingfeld present, who is to command the launch, we shall be glad to hear what he thinks about her.

CAPTAIN BEDINGFELD, F.R.G.S.—I am sorry that I can say very little about the launch at present, for I have not seen her. I am afraid that her length will be a great inconvenience to us. She is eighty feet long and only eight feet beam, and in that picture the house appears rather high for a puff of wind. I believe she is in three pieces, and I hope we shall be able to put the two ends together if we find her too long. However, when we are left to our own resources, I dare say we shall get her up the river in some way or other.

MR. MONTGOMERY MARTIN, F.R.G.S.—With regard to this expedition, or that to the Zambesi River, I venture to observe, that I have visited the Zambesi and all the Portuguese settlements on the eastern coast of Africa. The experience I had of the Portuguese settlements induces me to think it of the highest importance to get the practical co-operation of the Portuguese Government in this most important expedition, which is viewed with deep interest by the Christian and commercial, as well as by the scientific world. It appears to me that nothing should be left undone to secure the efficient and complete exploration of the country by Dr. Livingstone and his small band of brave and devoted companions, who, both on the east and on the west coast, will have to traverse Portuguese territories. It does seem to me advisable that the Council of the Geographical Society should request our Government to ask the King of Portugal, who is known to be an enlightened sovereign, whether one or two scientific gentlemen might not be disposed to accompany this expedition? Dr. Livingstone is himself the best judge whether such a proposal be worthy of consideration, and I venture to think it would be acceptable to this large assembly to hear his observations upon it.

DR. LIVINGSTONE, F.R.G.S.—There may be some difficulty in getting members of different nations to act in concert who do not understand each other's language. We shall find sufficient difficulty with the natives with whom we shall come in contact. The Pasha of Egypt acted upon the principle suggested, to a great extent, and spent about 20,000*l.* in sending a number of men of different nations on an expedition up the Nile to discover the sources of that river. Before they got above the first cataract they, however, got to loggerheads, and the only man who passed the cataract was an Englishman—young Twyford, a Fellow of this Society. If we may take warning by this example, I think it is not advisable to join the members of different nations together in one expedition. There is another thing to be borne in mind. We are Englishmen, and we do not like slaves. All the Portuguese out in that country are in the habit of using slaves. I would not like to have slaves in my party. I like to go and be able to say to the natives—"You see my men—they are

all free men; we have no chains amongst us. We are free men, and want you to give up the slave-trade." Now, although the Government of Portugal is very anxious to get slavery abolished, yet their officials out there may not have the same enlightened views. I have the fullest confidence in the King of Portugal, and that he would do anything in his power to put an end to slavery in all his dominions. Very excellent laws are made, but as soon as they get out there they are entirely inefficient. That is the case in a great many other instances. Take the carrier-system, for instance, in Angola. One law after another has been passed in Portugal putting an end to this system in Angola, but it goes on all the same as ever it did. I think it would be best for the success of the expedition to have it as simple as possible, and as few men in it as possible. If we have a great number of men we shall have a great number of tempers, and we are none of us perfect. A few men can always get on very much better than a large body of men. There are other considerations that induce me to think it would be better to have a limited party. This is a tentative expedition, sent out to get certain information. I came out of that country alone. I stated the impressions that were made upon my mind by what I saw. But before any decided action has taken place I should like to gain fuller information about the country. On that account I propose to take a practical mining geologist, who will be able to give a clear idea of the mineral resources of the country. I want, too, a practical botanist, not one who will run about after a new species of cryptogamia and things that we do not care to know about, but a man who is acquainted with the medicinal properties of plants. Several medicines go from the east of Africa to Bombay, and are thence brought in that roundabout way to England. I want a man who knows the medicines we now use, to see if they are to be found in that country, who understands about different fibrous substances used in commerce, and also the different dye-stuffs. I want this man to give a full account of the resources of the country. Then, if any action is taken, let it be taken on the full report of these scientific men. I think the men we now have will form a very compact body, and I hope we shall all keep our tempers, and come back with some valuable information.

THE PRESIDENT.—Dr. Livingstone has very well explained the reasons for not having a mixed expedition, but has omitted to state that the British Government has decided that no person should be attached to the expedition but those with special scientific vocations. If three or more Portuguese gentlemen with their servants were to be added, all talking a separate language, the expedition would be much hampered.

MR. MONTGOMERY MARTIN.—Has the sanction of the Portuguese Government been obtained to the expedition? because we shall have to go through their territory.

THE PRESIDENT.—The communications of the Portuguese Government have been of the most friendly nature; and through their minister here, the Count de Lavradio, who has already shown deep sympathy and interest in the cause, they have expressed their earnest desire to assist Dr. Livingstone. I may add, that Dr. Livingstone intended to visit Lisbon, notwithstanding the prevalence of the yellow fever, but that our Government restrained him on account of the risk to his own valuable life; and even now, if the expedition be fitted out in time, Dr. Livingstone would willingly proceed by Lisbon, in order to wait upon the King, and show the perfect amity and good feeling that exists between the two governments in relation to this exploring journey.

The second Paper read was:—

2. *On Mounts Everest and Deodanga.* By Lieutenant-Colonel ANDREW SCOTT WAUGH, F.R.G.S., &c., (*Gold Medallist*, R.G.S.)

Communicated by Col. W. H. SYKES, M.P., V.P.R.G.S., &c.

Surveyor-General's Field Office, Dhera Dhún,
5th August, 1857.

MY DEAR THUILLIER,—In my letter No. 29, of 1st March, 1856, communicating the results of our calculations for the position and height of No. XV. in my list of Himalayan peaks, I stated my reasons for deciding to call this peak "Mount Everest."

At the August meeting, last year, of the Asiatic Society of Bengal, you were good enough to communicate the results regarding "Mount Everest" in an interesting address delivered by yourself. The facts having been thus promulgated, Mr. Hodgson endeavoured, in the *Journal of the Asiatic Society*, to establish the identity of Mount Everest with Deodanga, &c. The arguments adduced for this purpose were so palpably conjectural, resting on hearsay evidence alone, that I thought it needless to refute them, as their fallacious character was apparent to any person competent to understand the subject. The true geographical latitude and longitude of Deodanga are unknown to Mr. Hodgson, or even its true bearing and distance from any locality which can be recognised as a fixed point of departure. Its height also is unknown. All these data are elements necessary to the identification of that mountain. The physiognomical contour of a mountain is a very uncertain test, because it changes with every mutation of aspect; but even this test is wanting in Mr. Hodgson's case, as he has never seen Deodanga.

In April last my attention was drawn to another communication made by Mr. Hodgson to the Asiatic Society, from which it appears that he has taken steps to put the subject in what appears to me a very unfair light before the Royal Asiatic Society, as well as to have his conclusions on a point of great ambiguity promulgated as certainties in journals of extensive circulation: under these circumstances I considered that it would be satisfactory to scientific men that the grounds on which the supposed identity of Deodanga was made to rest should be examined and discussed. In my judgment the only proper way of doing this is to lay the whole of the documentary materials before a Geographical Committee composed of geometricians of experience and capacity, competent to deal with such investigations; with this view I issued the Departmental Orders annexed.

Of the five officers to whom this duty was assigned, four have now delivered their reports; the fifth, Lieutenant Montgomerie of the Engineers, is at present difficult to communicate with, being absent

in Thibet conducting the General Trigonometrical Survey operations beyond Kashmir. That officer's opinion will be very valuable, and (D. V.) shall be transmitted hereafter; in the mean time, encompassed as we are by the confusion and embarrassments attending a military rebellion of unprecedented magnitude, I am unwilling to delay the transmission of the four reports hereto annexed; these are so ably argued, and place the subject in so luminous a point of view, that it is unnecessary for me to add more than a few words in this place.

Mr. Hodgson labours under a strong conviction that Mount Everest is identical with Deodanga; and the ingenuity with which he advocates his view of the question seems to have carried the same conviction to the minds of others not conversant with the facts. It is easy to see how this fallacy originated in his mind. The Sketch Map published by him in the Journal of the Asiatic Society, December 1848, gives his idea of the configuration of that part of the Himalayas; a more erroneous impression of the formation of the country was never formed; he represents a solitary mountain occupying a vast tract. If this unity really existed, the identity of Mount Everest and Deodanga would indeed be indisputable, as it would rest in the fact of there being only one mountain within a given space; this single mountain, however, is entirely imaginary. The range presents the appearance of a "sierra" with innumerable peaks and groups of peaks. Among these nine have been fixed by the General Trigonometrical Survey of India, and are marked XII to XXI in the chart accompanying Mr. Scott's report. Besides these nine, several others are more or less partially visible, which we were unable to identify; and those who have any experience in conducting geodetical operations in the Himalayas can harbour no doubt that many other peaks do exist which have been concealed from our view by intermediate ranges. It is well known to surveyors that among a number of peaks having various altitudes and distances, the highest point in appearance is not always the highest in reality, the ocular deception being caused by the increment in the earth's curvature and decrement in the subtended angle caused by distance.

The erroneous idea Mr. Hodgson has formed of the configuration of this mountain range is sufficiently proved by his sketch map already referred to. If further proof were necessary, it may be derived from the statement Mr. Hodgson has given of the opinion he communicated to me when I returned from the expedition I made into Sikim in 1847. Having mentioned to him that I had seen from the confines of that province an enormous snow-mass lying in a north-westerly direction from Tonglo, he immediately pronounced it to be "Deodanga." Now the mountain I then saw was not Mount Everest, but No. XIII, which Major Sherwill has so well described

in the Asiatic Journal. Thus Mr. Hodgson has attributed the same name to No. XIII and to No. XV, without any exact knowledge of the height or position of either. He has fallen into this mistake from adopting the erroneous conception that there is only a single mountain in all this wide space.

Mr. Hodgson proves no more than that there is, according to native report, a mountain called Deodanga somewhere between our Nos. XI and XXI (vide chart). That mountain may be one of the peaks fixed by us, or it may be one that we failed to fix, or it may not have been visible to us at all. If Deodanga is to be taken as the highest peak, that allegation only rests on the hearsay evidence of natives unable to determine the actual height of a mountain; and if it be a true guess on their part, it by no means establishes the identity of Deodanga, because we do not know for certain that Mount Everest is the highest culminating point; all we do know is, that it is the highest point we have measured.

The only satisfactory way in which the position of Deodanga can be determined is by carrying up a series of triangles towards it until it can be seen and identified; operations of this kind are impracticable at present for political reasons. In the mean time the position and height of Deodanga constitute a geographical problem remaining to be solved. If it is not identical with Mount Everest, a very grave blunder would be committed by assigning its name to another peak; if it is identical, no harm will have been done by the adoption of another cognomen pending the doubt now existing.

Great stress has been laid in some quarters on the fact that the position of Deodanga is given in German Maps; now this proves no more than that German geographers are rash enough to lay down anything upon hearsay; for we know beyond all question that no competent European with adequate means has ever been in the vicinity of Deodanga so as to be able to fix it. Deodanga does not appear in English maps, because it would be inconsistent with the rigorous notions which prevail among English scientific men in general to pretend to give the position of a point on the earth's surface on hearsay evidence. It would violate every principle of accuracy and precision laid down by my predecessor for the conduct of the Trigonometrical Survey of India to jump at conclusions in this reckless manner.

As the principle of adopting an European name has been much commented upon, I will here add without further remark paragraphs 6 and 7 of my letter to your address cited at the commencement of this letter.

"I was taught by my respected chief and predecessor, Colonel George Everest, to assign to every geographical object its true local

or native appellation, and I have always scrupulously adhered to this rule, as I have in fact to all other principles laid down by that eminent geodist.

"But here is a mountain, most probably the highest in the world, without any local name that we can discover, whose native appellation, if it has any, will not very likely be ascertained until we are allowed to penetrate into Nepal."

In conclusion, as the Asiatic Society has inserted in its Journal papers tending to mislead in regard to the identity of Deodanga and Mount Everest, I trust that they will give prominence to this discussion, which proves that the fact is not only doubtful, but far from probable, if the particulars supplied by Mr. Hodgson are correct so far as they go. Considering it a matter of importance that geographers should be enabled to form their own opinion on the subject, I request you will communicate this correspondence with its annexures to the Asiatic Society, retaining a copy for record.

I remain, my dear THUILLIER,

Your affectionate friend,

(Signed)

A. S. WAUGH.

P.S. You will perceive the gist of the question is not whether the mountain should be called Mount Everest or by its true native name (which is a principle not disputed by any one), but whether it can be called Deodanga without risk of error, in the absence of satisfactory proof that this is really its native name.

No. 10,267.—DEPARTMENT ORDERS.

Surveyor-General's Field Office, Dhera Dhún,
22nd April, 1857.

THE attention of the Surveyor-General of India having been drawn to the Proceedings of the Asiatic Society (as marginally cited),* it appears to him desirable that the question which has been raised as

* From Mr. B. H. Hodgson, submitting for the information of the Society and the public in general the following extract of a letter from the Secretary to the Royal Asiatic Society, in reference to the mountain "Deodanga" ("Mount Everest") of Colonel Waugh:—

"Your letter of the 27th October, together with your observation on the incongruity of assigning a European name to Indian localities already provided with native appellations, was received and read at our last meeting of the 17th inst.; and I have the pleasure to inform you that the members present unanimously expressed their concurrence with your view of the case.

"A notice of the paper was communicated to the Athenæum and Literary Gazette, and has appeared already in full in the latter journal. I have, &c.,

(Signed)

"EDWARD NORRIS, Sec. Royal A.S.

respects the identity of "Mount Everest" with "Deodanga" should be examined by a competent Geographical Committee in order to set that point at rest.

The Surveyor-General has carefully examined all that Mr. B. H. Hodgson has advanced in support of the identity of Mount Everest with Deodanga, and has formed his own opinion on the subject; but he thinks it will be desirable that the question should also be formally investigated by a committee, and the opinion thereof placed on record for general satisfaction.

The Committee will be composed as follows:—

Lieut. TENNANT, Engineers, 1st Assistant G. T. Survey. In charge Jogi Tila Series.

Lieut. MONTGOMERIE, Engineers, 1st Assistant G. T. Survey. In charge Kashmir Series.

J. HENNESSEY, Esq., 2nd Assistant. In charge of Geodetic Computations at Trigonometrical Survey, Head Quarters.

W. SCOTT, Esq., Chief Draughtsman in the Field Surveyor-General's Office.

J. W. ARMSTRONG, Esq., Civil Assistant G. T. Survey, &c.

The papers connected with Mount Everest, and Mr. Hodgson's alleged identification thereof with Deodanga, are at present under charge of Mr. W. Scott, who has spent a quarter of a century in unravelling more intricate geographical problems than this. Mr. Scott will form his own independent opinion and submit the same to the Surveyor-General, after which he will forward the papers to Mr. Hennessey.

Mr. Hennessey has been engaged on all the computations for determining the positions and heights of the principal peaks of the Himalaya range, including Mount Everest, and is well acquainted with investigations of this kind. He also saw Mount Everest when he was engaged on the north-east longitudinal series. After submitting his independent opinion to the Surveyor-General, he will forward the papers to Mr. J. W. Armstrong.

Mr. Armstrong is one of the gentlemen by whom Mount Everest was observed. He will forward his opinion to the Surveyor-General, and the papers to Lieutenant Tennant, by whom they will be independently received, thus giving the investigation the benefit of his eminent abilities in matters of difficult research.

From Lieutenant Tennant the papers will proceed to Lieutenant Montgomerie in Kashmir, whose recent experience in details of Himalayan geography will enable him to pronounce on this question a valuable independent opinion, which he will transmit with all the papers to the Surveyor-General.

(Signed)

A. S. WAUGH, Lieutenant-Colonel,
Surveyor-General of India.

*Memorandum by MR. W. H. SCOTT, Chief Draughtsman in the
Field Surveyor-General's Office.*

WITH reference to Department Orders No. 10,267, dated 22nd April, 1857, in which I am called upon to state my independent opinion on the identity of Mount Everest with Deodanga or Bhairavathan, I beg leave to report, for the information of the Surveyor-General of India, as follows:—

After a very careful examination of the papers specified in the margin,* I am humbly of opinion that there is no evidence to establish satisfactorily the identity of Mount Everest with Deodanga or Bhairavathan.

The routes of the two Nepalese embassies, from Katmandu to Pekin, no doubt contain much interesting detail; but unfortunately they do not assist us in the present investigation, because the azimuths or bearings, it will be seen, are not given, and consequently we can bring them to no account. It is essentially necessary that the position of Kutighat, or Bhairava Langur, should be known with some degree of certainty; but this we are unable to do by the aid of the papers in question, as will be apparent to all familiar with the subject. All the maps I have consulted only tend, in my humble opinion, to confuse and mislead: for instance, the direct distance of Kuti from Katmandu, according to Kirkpatrick's map, is only 48 miles, 88° N.E.; Walker's engraved map gives 63.6 miles, N. 60° E.; Parbury and Allen's, 60 miles, N. 55° E.; according to Crawford, 75 miles, 75° N.E.; Arrowsmith's map, 56.6 miles, N. 78° E.; according to the preliminary sketch map, compiled at the Surveyor-General's Office, Calcutta, 72.6 miles, N. 53° E.; according to the route of Kaji Dalbanjan Pande the distance is 101.5 miles. The Chountra omits Kuti altogether. Amidst these conflicting values it is of course impossible to arrive at any satisfactory conclusion. The following extract from a letter from Major Ramsay, Resident of Nepal, to Major Thuillier, regarding the compilation map of that country, dated 11th June, 1855, will serve to convey an idea of the conjectural materials and discordant elements we have to deal with:—"You are doubtless aware that no European has ever travelled in the interior of this country, and that

* Mr. Hodgson's letter on the Native Name of Mount Everest, J. A. S., No. 5, 1856. The papers referred to in that communication, and published in J. A. S. No. 6, 1856, are,—1st. Route of two Nepalese Embassies to Pekin, with Remarks on the Waterparting and Plateau of Thibet. 2nd. Systematic Summary of the Route from Katmandu to Pekin, by Kaji Dalbanjan Pande, 1822-23. 3rd. Abstract of Diary from Katmandu to Pekin, by Chountra Pushiker Shah, 1817. 4th. Memorandum on the Seven Cosis, with Sketch Map, J. A. S., 1848.

all the information we possess of it is derived from the reports of persons who are totally devoid of scientific knowledge, and are accustomed in their comparisons of distances to trust to vague estimates formed by parties who have travelled through the different districts."

With respect to the sketch map it will be seen that Mr. Hodgson gives only one isolated peak, segregated from all the rest, whereas nothing can be more contrary to the fact as regards the Himalayas; besides, the configuration of the ground must be very different from that represented by Mr. Hodgson, being in fact difficult in the extreme. There is, however, no evidence to show that Mount Everest and Deodanga are identical. Mr. Hodgson says, "The Bhutia Cusi has its sources at Deodanga, a vast Himalayan peak, situated some 60 or 70 miles east of Gosainthan, *and a little north and east of the Kuti Pass, being probably the nameless peak,** which Colonel Waugh conjectures may rival Kanchanjinga in height. The river flows from the base of Deodanga, past the town of Kuti, and has a south-west direction from Kuti to Dallalghat."—*Vide* 'Memorandum on the Seven Cosis.'

Now, on comparing Mr. Hodgson's sketch with the accompanying chart, which exhibits all our peaks laid down between Katmandu and Darjiling, it will be seen that it is not likely the Bhutia Cusi could have its sources at our Mount Everest, because it appears to me, as far as I can judge, that the Dud Cusi, which rises "amid the perpetual snows," and also the Arun Cusi, would be to the left and right of Mount Everest respectively, so that it does not seem clear how the Bhutia Cusi can originate from our Mount Everest.

Again, Mr. Hodgson says—"This great mass is visible alike from the confines of Nepal proper (the valley), and from those of Sikkim, and all the more unmistakeably because it has no competitor for notice in the whole intervening space. It is precisely half way between Gosainthan, which overlooks Nepal proper, and Kanchang, which overlooks Sikkim." Now, a slight computation will serve to show that Mount Everest is invisible from the valley, being depressed nearly one minute and thirty seconds below XVIII. The most conspicuous mass visible from Katmandu or the valley would be our peaks XIX. and XX. Nor is Mount Everest visible from the confines of Sikkim, as Major Sherwill did not see it anywhere on his route from Singelelah to Kanglanamo; the height of the latter place Major Sherwill estimates to be 13,000 feet. He says, "One mountain in the Nepal range is a most remarkable object, both for

* The words underlined by me are omitted in Mr. Hodgson's communication on the Native Name of Mount Everest, J. A. S., No. 5, 1856.

its curious shape and for its immense height: its name none of my party knew, nor have I yet succeeded in obtaining the name. The peak is a hollow crater-like mountain, probably 27,000 feet in height, with a long table mountain attached to it, both covered with glaciers. To the west of this great mountain are fine distinct peaks separating the large mountain from a hollow shell-like and perpendicular mountain about 26,000 feet in height.”—(‘Notes upon a Tour in the Sikkim Himalaya Mountains,’ J. A. S., No. 8, 1853.) The mountain herein alluded to is our XIII., the height of which is 27,779 feet, Mount Everest being depressed nearly 14 minutes below XIII.

From the foregoing I am led to infer that Mr. Hodgson has probably mistaken one peak for another, more especially since the country is said to be very polyglottic; in fact, Mr. Hodgson himself throws some doubt on the identity of Mount Everest with Deodanga, or Bhairavathan, or Bhairava Langur, or Gnalthamthangla, as his own expression, “being *probably* the nameless peak which Colonel Waugh conjectures may rival Kanchanjinga in height,” evidently shows. The following extract from an interesting account of the ascent of the mountain Sumeru Parbut by Captain Robertson, given in the Report of the British Association for the Advancement of Science for 1855, will serve to show how liable we are to fall into mistakes in identifying a group of peaks even when in their immediate neighbourhood:—“On the right of the glacier rose the three great Jumnotri peaks, designated in sheet 65 of the Trigonometrical Survey of India, black E, great E, and little E, the altitudes of which as given in map are 21,155, 20,916, and 20,122 feet. The peaks designated in the Trigonometrical Survey great E and little E, are the two summits of a mountain which the natives call Bunderpunch. On the left the glacier was bounded by a wall of precipices, terminating in the lofty snow-covered peak of Sumeru Parbut. The height of this peak is not given in the survey map, but from its appearance, as compared with that of the measured peaks, and also from the height it rises above the limits of perpetual snow, I should estimate its altitude at about 18,000 feet. The altitude of Bunderpunch-ke-ghattee I estimated at about 16,000 feet.

“In making my agreement with the Brahmin I was under the impression that Sumeru Parbut was one of the measured peaks, and it was not until I reached Bunderpunch-ke-ghattee that I discovered my mistake.”

W. H. SCOTT,
Draughtsman, Surveyor-General's Field Office.

Memorandum by J. HENNESSEY, Esq., Second Assistant in charge of Geodetic Computations at Trigonometrical Survey, Head-Quarters.

I HAVE carefully perused Mr. B. H. Hodgson's paper attempting to identify Mount Everest with some hill variously called "Deodanga, vel Bhairavathan, vel Bhairavlangur, vel Gnalthamthangla."

I am of opinion that Mr. Hodgson has advanced no evidence whatever to prove this identity.

The arguments stated, if indicating any one peak more than another, point to Peak XVIII. as the one called Deodhangla, &c.

Thus, Mr. Hodgson, speaking of Deodanga, says, "It is a great mass. . . . It is visible from the confines of Nepal (proper)."

Now the straight line passing through Mount Everest and XVIII. and extended towards Nepal, passes nearly through the centre of that valley, nor is there any point in the latter at which the angle Mount Everest and XVIII. exceeds 3° . Taking any point on the straight line, Mount Everest, XVIII., and valley, and within the valley, the latter peak shuts out the former, as can be demonstrated by calculation. It is also exceedingly improbable that the same does not occur from *any* point whatever in the valley; but, be this as it may, it is impossible, under the circumstance, that XVIII. would admit of a "great mass" of Mount Everest being seen.

And yet that Deodanga, &c., is *seen* from the "confines" of the valley, and that it is "a great mass," we have Mr. Hodgson's evidence to show. That gentleman has therefore demonstrated, at least, that Mount Everest and Deodanga are *not* identical.

I have seen Mount Everest, certainly, from near Titalyah in Purneah, very probably from other districts along the Terai. It never struck me as a great mass.

J. B. N. HENNESSEY, Second Assistant General
Trigonometrical Survey of India.

Memorandum by J. W. ARMSTRONG, Esq., Civil Assistant General Trigonometrical Survey of India.

IN compliance with Department Orders No. 10,267, by the Surveyor-General of India, under date the 22nd April, 1857, I beg leave to submit the following remarks on the question which has been mooted regarding the identity of Mount Everest with Deodanga vel Bhairavathan.

This lofty pinnacle of the Himalayas was observed by me in 1846 from a distance of above 200 miles, and by Colonel Waugh

and Messrs. Lane and Nicolson from different stations of the north-east longitudinal series, and characterised by each according to the nomenclature which each had adopted. When the observations were all collected, and the snow points discussed and arranged in order from east to west, this lofty peak was characterised by the numeral XV. There were no means of ascertaining either the name of this mountain or the names of the others which were observed; and when its stupendous height was finally determined, a name was sought for to stamp its greatness, and none presented itself in the absence of its own local appellation more fitting than that of our renowned ex-Surveyor-General.

This nomination has been impugned by Mr. Hodgson on the strength of certain data advanced by him in the Journals of the Asiatic Society of Bengal—data which cannot be received as conclusive because they are purely conjectural.

The first datum is a *conjectural bearing and distance from positions never visited*.

The other data are the itineraries of two Nepalese embassies to Peking, the distances of whose routes are equally conjectural. Mountainous as these routes must have been, and tortuous from the nature of the country, the distances noted as traversed must have been calculated, not so much by linear measure as by the difficulties encountered and the delays entailed.

Independent of these objections, this lofty snow peak is neither visible from the valley of Nepal, on account of an intervening though lower snow mount, nor even from the confines of Sikkim, for a similar reason; and, great as Mr. Hodgson's knowledge of the mountainous region of Nepal may be, his authority on the question at issue can be received only with diffidence, because it is enunciated without personal observation, and based upon the vague information of untrained travellers.

J. W. ARMSTRONG,
Civil Assistant General Trigonometrical Survey.

*Memorandum by Lieut. J. F. TENNANT, Engineers, First Assistant
General Trigonometrical Survey, in charge Jogi Tila Series.*

DURING the identification of Colonel Crawford's peaks, and the discussion of the identity of Mount Everest with Deodanga, I have paid a good deal of attention to the question.

There are no means of knowing the position of Deodanga beyond what are given by Mr. Hodgson. These consist,—1st, of an Itine-

rary by the two Nepalese embassies to Pekin; and, 2nd, of a paper on the Seven Cosis; 3rd, several assertions, for which no evidence is produced, in a letter to the Secretary of the Asiatic Society of Bengal.

As regards the first, or the Itineraries, I believe no person who has had any surveying experience can doubt their being absolutely useless as evidence of anything but the existence of a pass called Bhairava Langur. Mr. Hodgson supplies the information that it is identical in name with the adjacent mountain, which is, I conclude, derived from information. It is absolutely necessary, for using a route survey, that both bearings and linear distances should be given: the former in these routes are totally deficient; the latter are given along the road, which in mountainous countries would only be useful had nature so formed the passes that they should all lie in a straight line, and be reached one from another by a nearly level straight line. The document in question bears evidence that this is not the case by the route distances (117 miles). Mount Everest is far within Bhairava Langur, and this assumes the identity of their directions. If the Itinerary is competent to determine the position of Bhairava Langur, it is equally so to determine that of Pekin, and Mr. Hodgson would do geometers a service by explaining the process.

In a note to page 478 of No. VI. of the Journal of the Asiatic Society of Bengal, Mr. Hodgson says that Bhairava Langur is visible from the confines of Nepal (proper) as a great mass. Now, it is demonstrable that the summit of Mount Everest is *not* visible from Katmandu or any part of the valley of Nepal as a conspicuous or recognisable prominence, if indeed it at all tops the intervening snowy range. Mr. Hodgson also asserts that it is visible from the frontiers of Sikkim. It certainly is not visible from Kanglanamo, 13,000 feet high, being shut out by the shoulder of our Peak XIII.; and it is evident that the same result will be true all along the Singalilah range as far as Tonglo. I know that Mr. Hodgson asserts that it has no competitor for notice, but sound geometry contradicts Mr. Hodgson; and I for one prefer the evidence it gives to any that may be derived from the fallible rendering of fallible informants.

Mr. Hodgson further undertakes to find the name of any object whose bearing and distance he has. It may be possible in some cases, and possibly Dewalaghiri is one. I can only say, having surveyed myself among hills, that nothing is more fallacious than names given from a distance, even when an object is conspicuously visible. I myself believe that there is an identity between the mountains to which Captain Webb and the General Trigonometrical

surveyors have assigned the name of Dewalaghiri, but far be it from me to assert that that is its veritable name.

Mr. Hodgson is not probably less fallible than his predecessors, and yet Colonel Crawford places Dhayabang east of the meridian of Katmandu, nearly in the position of our Peak XXV., whereas another authority (Kirkpatrick) places it far west of that meridian; and here it is quite evident that the same name would not be assigned to the same peak. That Mr. Hodgson can get a name to any peak I believe; but that it will be the true name I do not believe, as a general rule.

2nd. Mr. Hodgson gives a Memorandum on the Seven Cosis, with a sketch. The sketch has no scale, and is confessedly a roughly-drawn document not founded on survey. It can, therefore, hardly be admitted as evidence of anything, but I shall show reason to doubt its being in Mr. Hodgson's favour.

Mr. Hodgson in the paper asserts,—1st, that there is a mountain called Bhairava Langur, or Deodanga; 2nd, that that mountain is the source of the Bhutia Cusi; 3rd, that it is the same as Mount Everest of Colonel Waugh; 4th, that Mount Everest is in the place of the source of the Bhutia Cusi.

I have said there is presumptive evidence of the first assertion.

The second assertion rests solely on information which is not very reliable (as far as the experience of accurate surveyors goes) at the best; and is peculiarly liable to error in this case, as the Bhutia Cusi is only one of several confluent streams, and has never been seen, as far as I learn, in its separate form by any European; consequently its course must be liable to great error.

Mount Everest is stated to be identical with the source of the river, as the occupant of the same position; but, if this position be untrustworthy, there is an end of this, and consequently the proposition that both, being sources of the same river, are the same, falls to the ground.

The real result is from this paper that,—1st, there is a mountain called Deodanga the source of a river; 2nd, that a stream called the Bhutia Cusi comes from a snowy mountain; 3rd, that the coincidence of these two mountains is, to say the best, subject to doubt; and 4th, that there is no evidence to show the latitude, longitude, and height of Deodanga and Mount Everest to be identical at all.

If the sketch map be a true representation of the courses of the streams given, I believe Mr. Hodgson will be puzzled to find room for his other Cosis, giving each the feeding area necessary for its size.

If the mountain Deodanga be a little north and east of the Kuti Pass, unless that has been grossly misplaced by all the geographers who have exercised their talents on it, Deodanga is *not* Mount Everest.

I am aware that Mr. Hodgson says he has "explained the identity to the Society;" but I see no evidence to satisfy a geographer; and, were any evidence wanting to show a prejudgment of the case, we have his own letter, from which I quote as follows:—"A few words more may be given to the last point, as being the matter which chiefly forced my attention, as a political officer in Nepal, on the site of Mount Everest, and enabled me in after years, when I heard surmises (from, I think, Colonel Waugh himself, or from some of his subordinates) of the great height of a peak in that direction, to fix on Deodanga or Bhairavathan (both names are used) as being the enormous snow mass in question, and I have often of late repeated this here very recently to Mr. Blandford." All which demonstrates that before Mount Everest was named, or its definite position fixed, Mr. Hodgson had committed himself by repeated assertions of the identity of the forthcoming highest peak and Bhairavathan—an admission in itself sufficient to render all his evidence valueless.

Having got this fixed idea, Mr. Hodgson next has collected data for Bhairavathan or Deodanga, indefinite in themselves, and which might apply to any mountain-peak within a considerable range, including Mount Everest of course. On only one of these, or rather on a class of them, I think further comment necessary. The position of Mount Everest is connected with that of Gosainthan as a known point, but I have shown that name is not an evidence of identity. Further, the position of Gosainthan given in the Physical Geography of the Himalayas is not that generally given even as regards Katmandu; and, thirdly, that the longitude of Katmandu itself is uncertain to a small extent, and was so to a great amount till the identification of Colonel Crawford's peaks with ours reduced the limits, all which tells on the position of Deodanga.

On the whole, we have no evidence that Mr. Hodgson even saw Mount Everest, or that any one else ever recognised its pre-eminent height; for, contrary to Mr. Hodgson's repeated assumptions, it is demonstrably not a very conspicuous mass from a distance. There is a wide difference between the manner in which the known names have been given and that in which it is proposed to force this on us. All the points to which names have been given are laid down by competent surveyors under those names in most cases by some of the men who have fixed the final position. Deodanga has never

been so defined; and, even on Mr. Hodgson's showing, the names may be those of passes, or mountain masses, or particular prominences.

Mount Everest is the assigned name of a protuberance of no very large extent; and it would be most inadvisable, in my opinion, to abandon this definite name, which will soon be familiar to every English or European child, for one of the, to Europeans, unpronounceable names given by Mr. Hodgson, whose application is, to say the least, extremely doubtful, and whose misapplication would cause endless confusion.

J. F. TENNANT, Lieut. Engineers,
First Assistant General Trigonometrical Survey.

(True Copies.)

A. S. WAUGH, *Lieut.-Col., Surveyor-General
of India, and Superintendent of General
Trigonometrical Survey.*

The PRESIDENT.—We return thanks to Colonel Waugh and the officers under him for this valuable communication. I cannot conceive military engineers performing any duty more grateful to themselves than that of testifying to the merit of their former chief, by attaching the name of Everest to the highest mountain in the world.

NOTE TO MAP.—The longitudes are referable to the old value for the Madras Observatory, $80^{\circ} 17' 21''$, to which a correction of $3' 25'' \cdot 5$ is applicable to reduce to the value adopted by the Admiralty, Lt. Raper, and the Royal Astronomical Society, or $3' 1'' \cdot 8$ to reduce to the result of Taylor's observations up to 1845.

Heights brought up from the Sea level at the mouth of the Hoogly by trigonometrical levelling, and verified by extension of the operation of the Sea at Bombay and Karachi.

The Peaks marked A, B, C, &c., are identical with Colonel Crawford's Points, and are so characterized by him.

W. H. SCOTT,
Chief Draughtsman Surveyor-General's Field Office.

A. S. WAUGH, *Lieut.-Col.,
Surveyor-General of India.*

ADDITIONAL NOTICES.

THE FAREWELL LIVINGSTONE FESTIVAL.

THE festival in honour of Dr. Livingstone on his departure to explore the river Zambesi and the interior of South Africa, which originated in the Royal Geographical Society and was organized by the zeal of some members of that body at a few days' notice only, was held at the Freemasons' Tavern on the 13th February, 1858, Sir RODERICK MURCHISON in the Chair.

A wish having been expressed that a more ample account than appeared in the Daily Newspapers, should be preserved of the speeches made on that occasion, a record of them is now printed, to form a popular part of the Proceedings of the Royal Geographical Society; in order to mark the cordial spirit and right feeling with which the public were actuated in offering a farewell to the great and meritorious African Traveller.

It was intended to limit the number of his friends present to 250; but so great was the pressure for admission, that accommodation and good fare had to be provided for upwards of 350 persons, of whom a list is annexed, so far as the names were inscribed.†

Their Excellencies the Ministers of Sweden and Norway and of Denmark; the Dukes of Argyll and *Wellington; the Earls of Shaftesbury, Grey, *Sheffield, and *Shelburne; Lords *Radstock and Ebury; the Bishops of *Oxford and *St. David's; the Honourables Captain J. *Denman, R.N.; A. *Kinnaird, M.P.; and E. B. Wrottesley; Count *Strzelecki; Sir B. *Brodie; Sir E. North *Buxton, M.P.; Sir J. *Clark; Sir Culling *Eardley; Sir William Fraser, M.P.; Sir Ralph *Howard and Sir Moreton *Peto, M.P.; Sir John Forbes; Sir Charles *Nicholson; Sir John *Rennie; Rear-Admirals H. Austin, Sir G. *Back, and H. D. *Trotter; Major-Generals Murray, Hay, and J. E. *Portlock, R.E.; Messrs. W. E. Baxter, M.P.; W. Buchanan, M.P.; A. M. Dunlop, M.P.; J. Kershaw, M.P.; W. S. *Lindsay, M.P.; E. Miall, M.P.; J. *Pilkington, M.P.; J. Richardson, M.P.; J. Slaney, M.P.; Colonel W. H. *Sykes, M.P.; and J. A. *Warre, M.P.; Aldermen Exall, Finnis, and Wire; Baron de *Forrester; Chevalier de Forrester; Colonel Burgwyn (U.S.); Captains A. B. *Becher,

† The * denotes the Fellows of the Society.

R. *Collinson, W. H. *Hall, and M. S. *Nolloth; Commanders *Bedingfeld and Dayman, Royal Navy; Consuls Alcock, G. *Brand, and C. H. *Dickson; Major Ditmas; Captains Burgess, and L. T. *Cave; Lieutenant P. A. *Halkett, R.N.; and V. Zaroudny of the Imperial Russian Navy; the Reverends W. Cardall, A. Church, D. S. *Halkett, J. Hill, J. Hutchinson, C. Livingstone; T. *Marziot, W. Mitchell, J. F. Ogle of Patagonia, and C. S. Stewart (U.S.); Doctors Aikin, Cape, Cooke, Copland, Diamond, Gladstone, Hall, Hull, Bence Jones, J. *Kirk, E. Lankester, Waller Lewis, David Livingstone, J. O. M^cWilliam, Charles Murchison, W. F. *Packman, J. Percy, Lyon Playfair, C.B., Pointer, Price, William Sharpey, H. Norton *Shaw, F. Sibson, W. Smith, J. Trounser, and G. *Webster; Professors Bentley, Huxley, Maskelyne, R. Owen, Ramsay, Warington Smyth, and J. *Tennant; Messrs. Henry Ancell, S. H. Angier, George A. Arbuthnot, John *Arrowsmith, J. K. Aston, T. W. Aveline, T. *Baines, S. W. Baker, Charles Barry, James *Bateman, J. D. Barry (Cape of Good Hope), Joshua *Bates, J. *Betts, A. F. *Birch, J. W. *Birch, J. G. Blake, Wollaston *Blake, H. G. *Bohn, F. W. Bond, J. Boord, G. T. Bosanquet, H. W. Bristow, W. J. Brodribb, G. T. *Brooking, T. H. *Brooking, John *Brown, J. Brown, W. J. Browne, H. *Browning, C. Capper, L. P. *Casella, S. *Cave, D. Chambers, J. W. *Childers, C. Churchill, G. *Clowes, W. J. Cockerell, E. *Coghlan, H. W. Cole, R. *Cooke, Corscadden, Norman *Cowley, W. W. Crispin, Croggon, W. F. *Cumming, J. *Cunningham, Deorman, C. Wentworth *Dilke, H. *Donkin, T. Donkin, E. R. Dorrell, E. W. Dundas, J. Earle, Edmonstone, W. Ewer, P. Fenton, A. *Findlay, A. G. *Findlay, F. Fitch, A. P. Fletcher, C. *Fraser, J. P. Gassiot, J. Gayton, G. Gladstone, A. *Gordon, J. *Gould, G. P. Green, W. N. Green, T. *Greene, J. Griffin, W. D. Griffith, C. L. *Gruneisen, G. Hall, S. C. Hall, W. J. *Hamilton, J. Hammond, G. F. *Harris, W. Helps, E. *Heneage, R. Hepburn, F. Hicks, T. Hicks, A. Hill, J. Hill, P. Hill, Hind, J. Holmes, L. Hope, Hornblower, B. Hornby, J. Hornby, H. H. Howell, J. W. Hulke, E. Hull, G. O. Irwin, T. Ivens, J. James, W. P. Jervis, G. Johnstone, W. W. Kilpin, E. B. *Lawrence, W. Laird, Macgregor *Laird, F. Leach, F. *Le Breton, P. Lecki, M. Lethem, T. *Lee, T. *Letts, Ch. Lewell (of Finland), Leyland, W. *Lockhart (of China), G. A. *Lloyd, W. Lovcroft, L. Lucas, E. M^cDermott, D. *M^cGregor, R. J. Macintosh, P. *Macintyre, A. Macmillan, C. Makins, J. Marshall, Montgomery *Martin, F. Marziot, A. Miall, D. W. Mitchell, F. D. *Mocatta, J. C. Moore, C. E. Mudie, J. *Murray, R. W. Mylne, E. B. Neil, G. *Nelthropp, H. *Nesbitt, G. Newman, D. Owen, W. *Phelps, J. S. Pigeon, J. Piggott, J. H. *Plowes, F. L. *Price, W. C. Prince, E. J. *Ravenshawe, R. Rawlinson, Trenham Reeks, J. *Reid, J. Reive, J. S. Renton, J. *Reynolds, G. T. Rose, A. Rowlandson, A. Sim, H. S. Skeats, R. Slater, E. Osborne *Smith, F. Smith, J. Sidney Smith, G. *Smith, R. Smith, T. Spalding, T. *Staveley, W. C. *Street, A. Stuart, H. Sturt, A. *Swanzy, W. *Tait, J. Taylor, R. Thornton, G. Tolstoy (of St. Petersburg), W. *Trotter, E. O. and H. *Tudor, A. *Vardon, Ch. *Verrey, G. Waugh, J. C. Webster, R. J. *Wheeler, Charles *White, H. *White, John White, W. Foster *White, J. H. Wicht (Cape of Good Hope), T. Wilcocks, C. Wilshire, W. H. Wilde, E. W. Wyon, J. *Yeats; C. Baring *Young, and C. J. Young, Esqrs.

The gallery was filled with ladies, among whom were the Countess Grey and Miss Copley, the Countess of Carnarvon, Mrs. Ashley, Mrs. Warre and Mrs. Henry Warre, Miss Burdett Coutts and Mrs. Brown, Lady Back, Lady Franklin, Mrs. Baines, Miss Cracroft, Mrs. Dundas, Mrs. Gordon, Mrs. Greene, Mrs. Portlock, Mrs. and Miss Wrottesley, Mrs. Owen, Mrs. and Miss Trotter, Mrs. Letts, Mrs. Bovet, Mrs. Findlay and the Misses Brown, Mrs. Lee, Mrs. Bedingfield, Mrs. White, Mrs. McWilliam and Miss Cooke, Mrs. Woodifield, Mrs. Le Breton, Mrs. Finnis, Mrs. Twyford, Mrs. Livingstone, &c.

Each Toast was given with all the honours, and the band of the Grenadier Guards played suitable and chiefly Scottish airs.

The Duke of Sutherland also sent his Highland Piper to enliven the festival in honour of a countryman.

Grace was said before dinner by the Bishop of St. David's, and after dinner by the Bishop of Oxford.

The Toasts and Speeches were as follows :—

SIR RODERICK MURCHISON.—As a loyal subject of Her Majesty, I rise to propose the health of our beloved Sovereign. (*Loud cheers.*)

Reigning over many a distant land, and engaging as She does the affection and devotion of all her subjects, whether in the remotest of her Colonies or in these Islands, our gracious Queen has, through the wide spread beneficence of her rule, gained a *new title*, which must, I am sure, be most dear to her heart, and which specially connects Her Majesty with the object of this meeting; for Livingstone has told us that Victoria is known throughout the now protected races of South Africa, as the Queen of the people who love the Black Man. (*Loud cheers.*)

And as a striking proof of Her Majesty's desire to extend the blessings of Religion, Civilization, and Commerce to the great interior of South Africa, She has appointed our dear friend to be her Consul at those Portuguese Settlements from which he can successfully and efficiently carry out his noble mission. (*Great cheering.*)

Let me now add, Gentlemen, a piece of information which in these days of rapid diffusion of intelligence is unknown to you;—nay even to the great Journal of Printing House Square, and which will, I know, give unbounded pleasure to you all. Her Majesty, with that good taste and right feeling which is peculiarly her own, and which has ever characterized her private as well as public conduct, has selected this very day of our farewell festival to grant an interview to Livingstone and kindly to wish him God speed!

“The Queen, God bless her.”

(*Enthusiastic cheers.*)

SIR R. MURCHISON.—Gentlemen, I now call on you to drink to the health of “H.R.H. the Prince Consort, H.R.H. the Prince of Wales, and the other members of the Royal Family.” (*Cheers.*)

Whenever it has been my lot to occupy the Chair at a public meeting, I have invariably spoken of the Royal Consort as a Prince who, loving and encouraging science, letters, and art, is continually striving to do practical good service, by diffusing education and knowledge through all classes of the community. (*Cheers.*)

And as teaching by example is more efficacious than a thousand precepts, we are grateful to him for having soon after Livingstone's arrival in England conversed for some time with our great traveller in the presence of the younger members of the Royal Family; and specially we applaud his conduct for so guiding the education of his children, that in addition to the instruction usually given to Royal personages, the Prince of Wales and his brother have been taught by Faraday (*loud cheers*) and others, those great truths of Science upon the cultivation and diffusion of which, the present and future grandeur of the British Empire mainly depends. Let us then cordially drink to the health of His Royal Highness the Prince Consort, the Prince of Wales, and the other members of the Royal Family.

(*Loud cheers.*)

SIR R. MURCHISON.—It gives me true satisfaction, Gentlemen, to see that the object of our meeting is supported by the Representatives of two Foreign Sovereigns who have just reached our shores, who come from northern countries which are connected with us by many natural ties, and to whose rulers and people I am bound in affection for kindnesses received during my explorations of Scandinavia.

I allude to their Excellencies the Minister of the King of Sweden and Norway, Count Platen; and the Minister of the King of Denmark, Admiral Van Dockum. (*Loud cheering.*)

The representative of another Sovereign, who by his acts has shown his hearty concurrence in this exploration of South Africa, is unfortunately prevented by illness from attending; but that nobleman, the Count de Lavradio, with the enlarged views and right feeling which characterize the representative of the enlightened King of Portugal, has thus written to me:—

“I should have been happy to have profited by this good opportunity to announce personally to the distinguished friends of Dr. Livingstone, that my august Sovereign no sooner learnt that Dr.

Livingstone intended to explore the Zambesi than he issued the most positive orders to the authorities of Portuguese Africa to offer to the learned and courageous traveller all the protection and all the aid which he might need, and to receive him with all the attention due to his great merits.

"Be assured, my dear Sir Roderick," his Excellency adds, "that my Sovereign, as enlightened as he is virtuous ['We all know the merits of the young King,' interposed the Chairman (*loud cheers*)], rejoices whenever it is in his power to do anything to advance civilization and to afford some proof of his unalterable affection for his most ancient, most constant, and most natural ally, Great Britain." (*Loud cheers.*)

"I have full confidence," continued the Count, "that the new explorations of Livingstone will have great results for science, commerce, and the civilization of Africa. The infamous slave trade can never be brought to an end without first putting a stop to slavery in the interior of Africa, which will be the more easily brought about when the unfortunate Africans are instructed in the principles of religion and education, and are taught the true value of labour.

"I offer then my most ardent hopes for the prosperous journey of Livingstone and for the success of his researches, trusting that he may return safe, sound, and glorious, to receive the blessings of his countrymen and those of the enlightened men of all countries." (*Loud cheers.*)

Reverting now, Gentlemen, to the toast, "The Ministers of Foreign Powers who have honoured us by their presence," I drink to the health of our distinguished visitors Count Platen and Admiral Van Dockum. (*Great cheering.*)

COUNT PLATEN, in responding to the toast, said that he should ever take a deep interest in any enterprise which affected the prosperity of Great Britain, not only on account of the mutual relations which existed between England and that country of which he was the representative, but also from personal feeling; for perhaps the three happiest years of his life had been spent, if not upon English ground, at least upon English bottom, he having served three years in the British navy. (*Loud cheers.*) He could only add that, in common, he was sure, with all those to whom the toast referred, he most cordially concurred in the great objects of the expedition of their distinguished friend Dr. Livingstone, and, in the name of his colleague and himself, he most heartily wished him complete success, and a safe return to his native land. (*Loud cheers.*)

SIR R. MURCHISON.—On no former occasion did I ever propose the toast of the Navy and Army with a higher satisfaction than at the present moment; for never at any period of my life was I more proud of the heroism of my countrymen, whose noble bearing in India not only excites the heartfelt applause of every Englishman, but is, I know, extolled by foreign nations as a prowess scarcely if ever paralleled in the annals of war. (*Loud cheers.*)

And though the men of my old profession, the soldiers, have necessarily had to bear the brunt of this great spasmodic and unexampled Indian outburst, we all know how an intrepid band of blue jackets under William Peel have mainly contributed to the winning of victories a thousand miles distant from that element in which they are supreme, and will I trust for ever remain so. (*Loud cheering.*)

Gentlemen, in alluding to the Army let me say, that I cannot now wear a Peninsular medal, and recollect that I am one of those still surviving who had the honour to accompany our great Duke when he first set his foot on the shore of Portugal, without expressing to you the sincere gratification it gives me to see here, and sitting by the side of Livingstone, the son of that illustrious man (*great cheering*). My regard for the present Duke has indeed been recently raised into high respect, by knowing that it is the anxious study of my noble friend to search out and publish documents which, but for the devotedness of the son, might have lain long in obscurity—documents which now issuing from the press demonstrate, that the young Wellesley, the rising soldier of India, possessed even then much of the thoughtfulness, prescience, and wisdom which characterized the future Wellington. (*Loud cheers.*)

It would naturally be my wish to call upon the son of my revered commander to answer for the Army; but I have not forgotten military duty, and a senior officer is present—one, fortunately, who is directly and honourably connected with this festival; for it was General Murray Hay, who, commanding in the Mauritius, received Livingstone when he emerged from the east coast of Africa, and was the first of our countrymen who hospitably sheltered the houseless traveller. (*Loud cheers.*)

In like manner it gives me real pleasure to perceive that the Navy is represented by my gallant and good friend Admiral Trotter, whose name and exploits are interwoven with the cause of the civilization of Africa (*cheers*), and who, when recently on duty at the Cape Station, was most serviceable in enabling us to keep up our intercourse with the great traveller in the interior of Africa. (*Cheers.*)

I give you then the Navy and Army, and call on you to drink to

the health of Admiral Trotter and General Murray Hay. (*Loud cheers.*)

REAR-ADMIRAL TROTTER.—I rise to return thanks for the Navy on the present occasion with peculiar pleasure, as I claim for our service the honour of having most powerfully operated in the same cause with our distinguished guest—I mean the civilization of Africa; and I believe Dr. Livingstone has lost no opportunity of proclaiming in his addresses, though that part of them to which I allude has not always been faithfully reported, that all hope of success in that great object over that vast continent depends, humanly speaking, on the extinction of the slave trade, and that the most powerful and indispensable means to this end is the British squadron on the coast of Africa: our efforts in this cause, in conjunction with the exertions of such men as Livingstone, will hereafter be classed amongst the noblest deeds of the Navy.—It is therefore, I say, with especial pleasure that I return thanks on the present occasion. (*Cheers.*)

MAJOR-GEN. MURRAY HAY.—Being the senior military officer present, it is my duty, Sir, to respond to the toast you have proposed, and the great and immortal man so justly eulogized by you, has taught us that to a soldier duty is a sacred word.

Distant employment prevented me from sharing personally the brilliant services of the army of the Crimea, but it is to me a great consolation to think that I was thereby enabled to form, I trust, a lasting friendship with our distinguished guest, Dr. Livingstone. On his arrival at Mauritius, I received him as a comrade from a hard fought and gallantly won battle; for he too is a soldier, a soldier of the Cross. (*Cheers.*) The unanimous voice of this great nation has proclaimed, loudly proclaimed, that the British Army has gloriously upheld the renown of its predecessors and of its country, and that Army has received the reward dearest to the heart of a soldier in the applause and approbation of our gracious Queen and the thanks of a grateful country. (*Loud cheers.*)

SIR R. MURCHISON.—I rise, Gentlemen, to propose the toast of the evening—"Health to the excellent man who sits on my right hand, and success to his expedition." (*Vehement and long continued applause.*) When this farewell dinner to my distinguished friend was suggested ten days ago only, by a few ardent geographers, with a request

that I would take the Chair, it might well have been supposed that in so brief a space of time it would be difficult to obtain an attendance worthy of the great occasion ; but I felt assured that the name of Livingstone alone would attract an assembly larger than any room in London could contain. (*Cheers.*) My anticipation, Gentlemen, was correct ; and it truly gratifies me to see that this impromptu "coup de voyageur" has brought together men of real distinction in all the great classes of the British public. (*Cheers.*) The only weak part of the programme, I said to my friends, would be that of your Chairman (*cries of "No, no"*) ; but at all events, you know, Gentlemen, that my geographical friends and myself have done our best to honour the great traveller and good missionary. (*Cheers.*)

At any public meeting held a year and a half ago, it would have been necessary to dwell upon the merits of Livingstone ; but now his name has become a household word among my countrymen, and no efforts of mine can raise him higher in that esteem which he has won for himself, and specially I rejoice to say by the sale of 30,000 copies of the work issued by the flourishing firm of Murray, Livingstone, and Co. (*laughter*), and by which he has secured independence for himself, and a provision for his wife and family. (*Cheers.*)

My eminent friend has not only made us thoroughly well acquainted with the character and disposition of the inhabitants and the nature of the animals and plants of the interior of Africa, but has realized that which no missionary has ever accomplished before ; since with consummate talent, perseverance, and labour he has laid down the longitude as well as latitude of places hitherto unknown to us, and has enriched every department of knowledge by his valuable and original discoveries. These are great claims upon the admiration of men of science ; but, great as they are, they fall far short of others which attach to the name of the missionary who, by his fidelity to his word, by his conscientious regard for his engagements, won the affections of the natives of Africa by the example which he set before them in his treatment of the poor people who followed him in his arduous researches through that great continent. (*Loud cheers.*)

Sitting by my side (laying his hand on Dr. Livingstone's shoulder) is the man who, knowing what he had to encounter—who having twenty or thirty times struggled with the fever of Africa—who, knowing when he reached the western coast, at St. Paul de Laonda, that a ship was ready to carry him to his native land, where his wife and children were anxiously awaiting his arrival, true to his plighted word, threw these considerations, which would have influenced an

ordinary man, to the winds, and reconducted those poor natives who had accompanied him through the heart of the country back to their homes!—thus by his noble and courageous conduct leaving for himself in that country a glorious name, and proving to the people of Africa what an English Christian is. (*Loud and long continued cheering.*)

So much for the character of the man of whom, as a Scotchman, I am justly proud; and now a few words with regard to his present expedition, of which I may say that no enterprise could have been better organized than it has been, under the recommendation of my distinguished friend, aided by the countenance and hearty co-operation of Lord Clarendon, and the very judicious arrangements of Captain Washington, the Hydrographer of the Admiralty, on whom fortunately has fallen the chief labour of its organization. (*Loud cheers.*) The naval officer of the expedition is Commander Bedingfeld, a man well known to geographers for his successful explorations of the coast and rivers of Western Africa, especially the Congo, and my dear friend will no doubt receive substantial assistance from that gallant officer. (*Cheers.*) Dr. Kirk, of Edinburgh, an accomplished botanist, zoologist, and physiologist, also accompanies the expedition; whilst my clever young friend Richard Thornton will, I doubt not, do good service as the mining geologist. (*Cheers.*) Mr. Baines, too, whose previous travels in Africa and North Australia and striking sketches are well known to the public, will be there; and last but not least in usefulness among the members of the expedition let me mention Mrs. Livingstone. (*Loud and long continued cheering.*)

When I remember the efforts which have been made in the cause of Christianity and for the diffusion of knowledge by that exemplary lady (*loud cheers*), when I know how she, the daughter of that faithful missionary, the venerable Moffat, has educated her children, and when I see the spirit with which she is again going to cross the broad seas and to share all the toils and perils of her husband, I cannot but think that the services of Mrs. Livingstone (acquainted as she is with many of the languages of South Africa) will tend materially to the success of the expedition. (*Loud and protracted cheering.*)

But, Gentlemen, I would not, however, wish you to raise your hopes too high as to the immediate results of this expedition, which is in truth one of an exploratory character only. It is, in fact, merely the sowing of the seed which, under God's Providence, may produce an abundant harvest. We must not look to a sudden importation of indigo or of cotton, and those raw materials which

we manufacture in this country, nor must we expect suddenly to light upon a new El Dorado; though I believe that my friend may find districts which abound in gold and copper, and good thick coal-seams.

Yet if, after all, those expectations to which the commercial world looks should fail—if we gain nothing more than the implanting in Africa of that good name which Dr. Livingstone is sure to leave (*cheers*), and that accession to our knowledge which the discoveries of our great explorer are certain to supply, and which it would be a disgrace to Britain not to endeavour to obtain, even then I say that the Livingstone expedition will have a great and a glorious issue. (*Loud and long continued cheering.*) I propose, therefore, the health of our eminent friend Dr. Livingstone, and success to his noble enterprise. (The toast was drunk with the utmost enthusiasm; and after the cheering had ceased, at the suggestion of a gentleman in the body of the room, three more hearty cheers were given for Mrs. Livingstone.)

The name of Sekeletu, chief of Livingstone's Makololo friends, was announced at the bottom of the room, and a cheer was claimed for him.

DR. LIVINGSTONE, in rising to return thanks, showed unmistakeably how much he was affected by the reception which he had met with.

He said,—When I was in Africa I could not but look forward with joyous anticipation to my arrival in my native land; but when I remember how I have been received, and when I reflect that I am now again returning to the scene of my former labours, I am at a loss how to express in words the feelings of my heart. (*Loud cheers.*) In former times, while I was performing what I considered to be my duty in Africa, I felt great pleasure in the work; and now, when I perceive that all eyes are directed to my future conduct, I feel as if I were laid under a load of obligation to do better than I have ever done as yet. (*Loud cheers.*) I expect to find for myself no large fortune in that country (*renewed cheers*), nor do I expect to explore any large portions of a new country; but I do hope to find in that part of the country which I have partially explored, a pathway by means of the river Zambesi which may lead to highlands where Europeans may form a healthful settlement, and where by opening up communication and establishing commercial intercourse with the natives of Africa they may slowly, but not the less surely, impart to the people of that country the knowledge and the inestimable blessings of Christianity. (*Loud cheers.*)

I am glad to have connected with me in this expedition my gallant friend Captain Bedingfeld (*hear, hear*), who knows not only what African rivers are, but also what are African fevers. (*A laugh.*) With his aid I may be able to determine the principles of the river system of that great continent; and if I find that system to be what I think it is, I propose to establish a *depôt* upon the Zambesi, and from that station more especially to examine into that river system, which, according to the statements of the natives, would afford a pathway to the country beyond, where cotton, indigo, and other raw material might be obtained to any amount.

I am happy also in being accompanied, as Sir Roderick has told you, by men experienced in geology, in botany, in art, and in photography, who will bring back to England reports upon all those points, which I alone have attempted to deal with, and with very little means at my disposal. (*Loud cheers.*)

The success—if I may call it success—which has attended my former efforts (*renewed cheering*) to open up the country mainly depended upon my entering into the feelings and the wishes of the people of the interior of Africa. I found that the tribes in the interior of that country were just as anxious to have a path to the seaboard as I was to open a communication with the interior, and I am quite certain of obtaining the co-operation of those tribes in my next expedition. Should I succeed in my endeavour—should we be able to open a communication advantageous to ourselves with the natives of the interior of Africa, it would be our duty to confer upon them those great benefits of Christianity which have been bestowed upon ourselves. (*Cheers.*) Let us not make the same mistake in Africa that we have made in India (*renewed cheering*), but let us take to that country our Christianity with us. (*Cheers.*)

I confess that I am not sanguine enough to hope for any speedy result from this expedition, but I am sanguine as to its ultimate result. (*Cheers.*) I feel convinced that if we can establish a system of free labour in Africa, it will have a most decided influence upon slavery throughout the world. (*Loud cheers.*) Success, however, under Providence, depends upon us as Englishmen. I look upon Englishmen as perhaps the most freedom-loving people in the world, and I think that the kindly feeling which has been displayed towards me since my return to my native land has arisen from the belief that my efforts might at some future time tend to put an end to the odious traffic in slaves. (*Loud cheers.*) England has, unfortunately, been compelled to obtain cotton and other raw material from slave States (*cheers*), and has thus been the mainstay and support of slavery in America. Surely, then, it follows that if we can succeed in obtain-

ing the raw material from other sources than from the slave States of America, we should strike a heavy blow at the system of slavery itself. (*Loud cheers.*)

I do not wish, any more than my friend Sir Roderick, to arouse expectations in connexion with this expedition which may never be realized, but what I want to do is to get in the thin end of the wedge (*cheers*), and then leave it to be driven home by English energy and English spirit. (*Loud cheers.*)

I cannot express to you in adequate language the sense which I entertain of the kindness which I have received since my return to this country, but I can assure you that I shall ever retain a grateful recollection of the way you have received me on the eve of my departure from my native land. (*Cheers.*)

Reference has been made in language most kind to Mrs. Livingstone. (*Cheers.*) Now, it is scarcely fair to ask a man to praise his own wife (*laughter*), but I can only say that when I left her at the Cape, telling her that I should return in two years, and when it happened that I was absent four years and a half, I supposed that I should appear before her with a damaged character. (*Laughter.*) I was, however, forgiven. (*Laughter and cheering.*) My wife, who has always been the main spoke in my wheel, will accompany me in this expedition, and will be most useful to me. She is familiar with the languages of South Africa, she is able to work, she is willing to endure, and she well knows that in that country one must put one's hand to everything. In the country to which I am about to proceed she knows that at the missionary's station the wife must be the maid-of-all-work within, while the husband must be the jack-of-all-trades without, and glad am I indeed that I am to be accompanied by my guardian angel. (*Loud cheering.*) Allow me, in conclusion, to say one word in reference to our excellent Chairman. In packing up my things a few days ago, I found the identical Address which he delivered to the Geographical Society in 1852, and which he had the impudence to send out to me in the heart of Africa, where it lay upon an island a whole year before I got it. In that Address my distinguished friend actually foreshadowed a great portion of my discoveries; and all I can now say is, that I hope he will not do the same again. (*Laughter and long continued applause.*)

The company then gave "Three times three for Mrs. Livingstone," and that lady, from the gallery, bowed in acknowledgment of the compliment. •

SIR R. MURCHISON.—I now call on my scientific friends and others to drink to the toast of “The Legislature which supplied the means, and the Government which prepared the measures, to carry out the Livingstone Expedition.” (*Applause.*)

It was indeed most cheering to all geographers and philanthropists to witness the cordial spirit with which the House of Commons granted the sum asked for to promote the Livingstone Expedition—a sum, however, which after all I consider somewhat inadequate to the great object in view (*hear, hear*), but which, in unison with the wishes of the public, the Parliament will, I am confident, augment when needful. (*Cheers.*)

As to the acts of the Government I can truly say, that having had opportunities of observing and scrutinising them, including the warm sympathy and aid of Lord Palmerston and his associates, I cannot too highly commend their conduct. Lord Clarendon in particular took the most lively interest in promoting the welfare of Livingstone long before the traveller came home, by sending out orders to succour the unaided Missionary; and he has since zealously and sincerely laboured to promote by every means in his power the present expedition, and has also counselled Her Majesty to give to our friend that public appointment which will enable him to be really useful; it having been a principle with the noble Earl to lose no opportunity of raising the position of the poor African, and of rendering him the cultivator of substances of which Britain has need. (*Cheers.*)

In proposing this toast of the Legislature and Her Majesty's Government, I call upon the Duke of Argyll to speak for the Upper House of Parliament and the Government, and Mr. Baxter for the House of Commons; and if the band will only play “The Campbells are coming,” we who know the powers of the Noble Duke are certain that a good speech will follow. (*Loud cheers.*)

THE DUKE OF ARGYLL.—I deem it a great honour, Gentlemen, to any Government and to any Parliament to be able to assist in that noble enterprise to which Dr. Livingstone has devoted his best energies, and to which he is now willing to devote his life. Perhaps no enterprise of modern times has attracted so large an amount of public attention; and this because it includes within itself almost every variety and degree of interest. First and foremost there is the interest which attaches to the character of the man; and it is right, Gentlemen, that this should be the first and foremost interest of all. The progress of the world depends upon its great men; and happy is that people which knows them when they appear. (*Cheers.*)

Dr. Livingstone has to-night told us, with that moderation and sobriety of expectation which is one of the most remarkable characteristics of his mind, that he looks for no great immediate results; but he hopes, he says, to be able to serve as the "small end of the wedge." Now, Gentlemen, I say that at all times and in all successful movements for the improvement of the human race, "the small ends of the wedge" have been individual men of great endowments for their special work. (*Loud cheers.*)

I will not dwell on some of those features in the character of Dr. Livingstone which have been referred to with so much feeling by our Chairman; but I think I cannot go far wrong when I say that one thing at least for which he is admired by his countrymen is for that lofty and enduring courage—that true British pluck—for there is no better word—of which we have lately seen many noble examples, but which has never been exhibited in a nobler form than that which—not under the strong incitement of a desire to preserve the lives of those nearest and dearest to him, or of the pride, the just pride of national dominion, but for objects hid in the far distant future—has sustained Dr. Livingstone for years through the deserts and the swamps of Africa. Then, as another great source of public interest, there is the love of natural science. I recognise around me the faces of many who are devoted to that science in its various branches: nor is there one of them who may not reasonably expect material additions to his knowledge from the researches of our guest. Dr. Livingstone has told us how our Chairman, in two great branches of inquiry in which he is almost equally distinguished, had in some degree anticipated and forestalled the result of his (Dr. Livingstone's) discoveries; and sharing as I am sure our Chairman does in the higher interests of this expedition, he cherishes also, I suspect, a secret hope that it may add another province to the already extended dominions of the Silurian king. (*Laughter.*) I see at this table my distinguished friend Professor Owen. He also, Gentlemen, is well able—no man more able—to appreciate the "higher ends" of our guest's exertions; but mingled with his interest in these, he too perhaps has an eye open to special pursuits—and to bones which may extend the range of his favourite "homologies." (*Laughter.*)

But the real source, Gentlemen, of the interest taken by the public in the enterprise of Dr. Livingstone, is the deep and abiding interest which they take in that great cause with which it is specially connected—that great cause to which their attention was roused in the last generation by the eloquence of Wilberforce and his associates—the cause of the African race. (*Cheers.*) I have been astonished during

this last week to receive from America a Journal containing the report of a discussion which has lately taken place in the Senate of that great Republic, in which it was asserted that there were evident symptoms of a change of feeling upon this subject in England. And I was even more surprised to see the reply made to that assertion by another member of the same body, which was to the effect that he did not believe there was any change on the part of the people of this country, although he feared there was a change of policy on the part of its Government. Now, Gentlemen, there is nothing I am more anxious to say on this occasion than to give an emphatic denial to both assertions. (*Cheers.*) There is no change in the feeling of the people—as little is there any change in the policy of the Government. I need hardly say that as regards slavery in America the Government of this country neither has, nor can have, any policy at all. There can be no doubt that any public or official interference on our part upon that subject would only tend to add to the many powerful motives already arrayed on the side of slavery, the just susceptibilities of national independence. But as regards the policy of the Government with reference to the Slave-trade, and generally towards the African race, it is the same as it has ever been since this country was awakened to her duty. I think I could appeal to the keenest opponent of Lord Palmerston whether, during his long and distinguished public career, there has been any subject on which he has shown more constantly his characteristic energy and tenacity of purpose. (*Cheers.*) I can sincerely say that the great motive which has induced him and my noble friend Lord Clarendon, and the other Members of the Government, to support the enterprise of Dr. Livingstone, has been the hope that it may tend to promote the civilization and improvement of the people of Africa. (*Loud applause.*)

Before I sit down, Gentlemen, I trust I may be allowed to refer for a moment to a matter which has been touched upon by our Chairman. I am proud of Dr. Livingstone not only as a Scotchman, but as a native of that part of the country with which I am more particularly connected. Dr. Livingstone has himself informed me that at a very recent period his family came from the little Island of Ulva, on the coast of Argyllshire, an island belonging to what Sir Walter Scott has called

“ the group of islets gay
That guard famed Staffa round.”

And I deem it, Gentlemen, a circumstance not altogether unworthy of remark, that Ulva stands in very close proximity to another island

which was one of the earliest seats of Missionary enterprise in our own country. Most of you will probably recollect the famous sentence in which the great moralist and philosopher of England, Dr. Johnson, records his visit to that celebrated spot. I think I can remember it with substantial accuracy. "We were now treading that illustrious island whence roving tribes and rude barbarians derived the benefits of knowledge and the blessings of religion. The philosophy of that man is but little to be envied whose patriotism would not kindle on the plains of Marathon, or whose piety would not grow warmer among the ruins of Iona." If such be the feelings with which we should tread upon the spot which at the distance of so many centuries has been hallowed by the footsteps of the Christian Missionary, surely it is with something of the same feelings of reverence with which we should assemble here to-night, to bid God-speed to one whose name will be remembered in after ages, and perhaps by millions of the human race, as the first pioneer of civilization and the first harbinger of the Gospel. (*Loud and long-continued cheers.*)

MR. BAXTER, M.P., in responding for the House of Commons, said that he regretted that the duty had been committed to so feeble hands as his. He believed that this honour had been conferred on him as the representative on this auspicious occasion of that Scotland which had given birth to, and which was so justly proud of, Dr. Livingstone. He only wished that his excellent friend had been present to hear the general and repeated cheers which in December last greeted the Chancellor of the Exchequer's proposal that a sum of money should be advanced for the purposes of a new expedition. As for the Government and the House of Commons, they had only done what it was their duty to do, and what the country demanded of them, and he hoped that the 5000*l.* grant would prove but the earnest and foretaste of what this nation would yet do for the cause of discovery and colonization in Africa.

SIR BENJAMIN BRODIE.—I shall not occupy your time, Gentlemen, for more than a few minutes before I name the toast which I have undertaken to propose.

We recognize in Dr. Livingstone the intrepid and enterprising traveller, exploring regions which, in great part at least, had not been before explored by Europeans, contributing to the general stock an abundance of valuable information in geography, in natural history, in geology; associating with races of mankind of

whom we had little or no previous knowledge, conversing with them in their own language, familiarising himself with their habits, institutions, and modes of thought; and thus promoting the advancement of that most important of all the sciences, the science of human nature. (*Cheers.*)

Nor was Dr. Livingstone thus occupied, as in the case of ordinary travellers, for a few months or for one or two years, but for many successive years. During this long period he continued his researches with unabated zeal; without being appalled by danger, or disheartened by the privations to which he was subjected, or the difficulties which he had to encounter; not the least of these being, repeated and severe attacks of bodily illness. (*Cheers.*)

But Dr. Livingstone is also presented to us under another aspect, as a Christian missionary, using his endeavours to extend the advantages of civilization, not after the fashion of the Roman conquerors of Gaul and Britain, by transplanting, at the cost of rapine and bloodshed, the arts and sciences of an older and more civilised people into the conquered country, but by communicating knowledge, promoting education, and inculcating the principles of a religion which enjoins the exercise of kindness, charity, and justice, which tells us that we are to forgive our enemies, and do unto others as we would that they should do unto us.

There are others in Africa engaged in the same pursuits, who, however occupied with their duties as missionaries, have found leisure from time to time to transmit to Europe important information on other subjects, and to whom science is much indebted; and I have to propose to you as a toast—"The members of the Missionary Societies who by their Christian labours have so much enlarged our acquaintance with Africa and its inhabitants." (*Cheers.*)

LORD EBURY said he sincerely regretted that his noble friend Lord Shaftesbury, who had taken such a deep interest in the career of Dr. Livingstone, should have left the room; for he could with so much greater propriety have responded to the toast which had just been proposed. The moral of the evening, however, was, that England expected of all her sons not only that they should do their duty, but that they should do it under the most adverse circumstances, and he could not shrink from attempting to perform this task to the best of his ability. If ever there was an occasion upon which the Missionary Societies might indulge in some pardonable degree of exultation, it was the present. (*Cheers.*) If they desired to view a successful monument of their labours, they might in truth point to the extraordinary man who sits beside the Chairman, and to the multitude of preeminently

honoured names in art and science, and, above all, the great work of Missionary enterprise, which thronged this hall. (*Cheers.*) Humanly speaking, theirs had been the task of giving to Dr. Livingstone the means of displaying those wonderful qualifications which have concentrated such unbounded interest in his proceedings, both past and future. It was for the public of England now to do its part,—to give free scope to this great genius in the double work of civilization and evangelization. They must have seen how Dr. Livingstone had successfully encountered all the trials of adversity, fatigue, sickness, weariness, hope deferred, peril of death. There yet remained one more trial, to some the sorest of all, namely, that of comparative ease, and the praise of all men. Believing, as the Missionary Society did, that his faith in Christ is firmly fixed, they doubted not he would go through this trial also without fail; but they would, he trusted, continue to offer up constant prayers for him in his new and dangerous position, that the blessing of the Almighty might still accompany him. For himself he would only add, that having had the privilege of presiding at the great missionary meeting which welcomed Dr. Livingstone back to this country at the termination of his unparalleled labours, and having witnessed the enthusiasm which then abounded, it would ever be a subject of the most gratifying remembrance that he had been permitted to take a prominent part upon this scarcely less memorable occasion, and have had the very distinguished honour, for such he must ever call it, of wishing this great messenger of Gospel civilization God-speed, on behalf of the Missionary Societies of Great Britain. (*Applause.*)

THE BISHOP OF OXFORD.—Mr. Chairman, the toast which has been committed to me is one as to the propriety of which all present have already expressed their opinion; for once and once only to-night there has been expressed a general dissent to an observation of yours, and that observation was that you were not the fittest person to fill that chair. (*Loud cheers.*)

In proposing, therefore, Gentlemen, to you the health of our Chairman, I know that I have with me the universal concurrence of all the members of this great gathering. (*Cheers.*) In truth, Sir, for reasons which connect themselves immediately with our important object to-night, you are the fittest man amongst us to occupy that post. For you as a most distinguished geologist and geographer, and as the head of the Royal Geographical Society, have done more by far than any who have not carefully examined the whole matter

can conceive, both to support our enterprising friend Dr. Livingstone during his arduous undertakings, and finally to crown them with success. (*Cheers.*)

Gentlemen, I need but draw your attention for a single moment to the pregnant words in which Dr. Livingstone has dedicated his recent volume to our Chairman in order to convince you of this. Weigh well these words, "as a token of gratitude for the kind interest he has always taken in the author's pursuits and welfare;" and then remember the simple-hearted, truth-speaking writer from whose pen they flowed, and you will be more able to estimate what were really our Chairman's services in this great undertaking. (*Cheers.*)

Truly it does need the combination of different men and different faculties before any such vast undertaking as this can be achieved. There must be, first, the physical, the intellectual, the moral, and the spiritual faculties combined in one person, which are so eminently combined in Dr. Livingstone, before the actual agent in such explorations can be provided. But then beyond these personal qualifications he must have support from home; there must be the mere physical support, as I may call it, of money, means, ships, companions, goods for presents, and the like; and then, far beyond these, there must be that internal consciousness of possessing the sympathy of hearty, generous, trusting friends at home; that inward stirring of a true national life within the individual; the reflection within himself of the outcoming towards him of the strong national life at home which makes the poet, or the hero, or the great explorer. In how many times of trial, difficulty, and despondency does the stirring of this inward life again invigorate the far-off man in the midst of his lonely wanderings in the desert! (*Cheers.*)

But then the existence of this home remembrance must, in a great degree, depend on there being at home some few who are able and willing generously to keep alive the home remembrance of the absent man and an interest in his work. For at home all things are moving so fast that things out of sight are soon things out of mind. The world round us goes at such speed, its objects, its cares, its pleasures, its amusements, its entanglements, shift and vary with such rapid and endless permutation, that unless there be some "Sacred prophet" evermore at hand to sing to us of the absent, he passes out of remembrance; and this work for Dr. Livingstone was done by our Chairman: from the chair of the Geographical Society, amongst men of science, amongst statesmen, he kept alive the interest which was due to Livingstone and his work. And how well

qualified above other men he was to do this, the rest of that dedication shows : for it embalms the really remarkable fact already alluded to, that our Chairman by his mere scientific deductions had arrived at the true hypothesis as to the physical conformation of the African Continent which Livingstone verified by actual observation. And so, for these discoveries, there were combined the various necessary conditions—(*Cheers*)—the Geographical Society, headed by its President, to solicit the Government to keep alive the interest of the public, and so to support the enterprising traveller. He, too, combined in himself rare faculties for his work of stepping out, if I may so express it, as to African explorations the first track of civilized feet on the dangerous and untrodden snows, which at any moment might be found to have merely loosely covered fathomless abysses. He had the physical strength needed for such work. He had the capacity for understanding the greatness of his enterprise, and, Gentlemen, I believe it to be full of the truest greatness. (*Cheers.*)

You will not think that I speak too strongly when I say that I believe we owe a debt of unparalleled magnitude to our dark brethren dwelling in that great continent. For we, as a nation, were of old the great founders and the great conductors of the accursed slave-trade. Complete at last, thank God ! but late as well as complete, was our repentance, and all that we can do we are bound to do to remedy the wrongs we have inflicted. And fearful have they been. How humiliating is it to us in our talk of the onward march of civilization, and of piercing with our discoveries into the heart of African barbarism, to learn from Dr. Livingstone that he can trace by the presence of vice, and crime, and rapine, and distrust, and insecurity of property and life, the very limits of the past intercourse of the black savages of Africa with the white Christians of Europe ! (*Cheers.*) For it was not only on the coast line that deep injury was inflicted by that accursed trade ; but far within that coast line, wherever the agents of that traffic penetrated, there were contamination and destruction. And how can this evil be undone ? Much may be done by our naval squadron, and for doing anything by any means I am convinced that its vigorous maintenance is essential ; but the best successes of that blockade can only create the calm necessary for the working of other influences, and amongst the very first, if not actually as the very first, of those influences I esteem the establishment of lawful commerce. (*Cheers.*)

Now, this Livingstone had the grasp of mind to perceive ; to see that he should be most effectually opening the way for the

future evangelisation of Africa, if he first opened a path by which lawful Christian commerce could pass and repass into those hitherto separated regions. (*Cheers.*)

Well, but in addition to this he had many other faculties, which all made up together the combination necessary to qualify him to act as the true discoverer of Africa. For, besides what I have named already, he had a clear, shrewd, strong understanding, great simplicity, great power of mastering languages, great courage, great power of influencing others, great gentleness by which he won on their affections, and, above all, he had, to qualify him for his work, downright, straightforward, sterling British truth and honesty. (*Great cheering.*)

For supporting, then, this man as he has supported him, we owe, I think, all thanks and honour to our Chairman, and I call upon you to drink with all the honours long life and happiness to him. (*Loud applause.*)

SIR RODERICK MURCHISON.—In returning you, Gentlemen, my warmest thanks for the flattering reception you have given to my name, and your kind acknowledgment of my services, let me say that I cannot have heard the band play the last air ("The Bannocks of Barley Meal"), preceded as it has been by so many good old Scottish tunes, without my heart overflowing, and being very proud that, like my friend Livingstone, I also am a Scotchman! (*Cheers.*)

I see indeed with pleasure sitting not far from me another Scotchman, the late Lord Mayor, Alderman Finnis, and near him Alderman Wire, both of whom were foremost in the good cause of welcoming our great traveller on his return, and in conferring on him the proud distinction of the freedom of the City of London.

But I pass from the personal considerations with which, in terms of much higher praise than I deserve, the Bishop of Oxford has been pleased to speak of my efforts in science, to the grand theme of the day, which his Lordship has illustrated with such fervid eloquence, and, if possible, still more to connect that theme with the special object of our present happy meeting. I will therefore just add this one phrase. I have before adverted to the wondrous exploits of Livingstone as a geographical traveller, and also to his noble moral bearing as a missionary; but I have still to point out one of the brightest features in his character when I say, that notwithstanding eighteen months of laudation so justly bestowed on him by all classes of his countrymen, and after receiving all the honours which the universities and cities of our country

could shower upon him, he is still the same honest, true-hearted David Livingstone as when he issued from the wilds of Africa. (*Loud and protracted cheering.*)

PROFESSOR OWEN.—I rise to express the pleasure with which I avail myself of the opportunity I am favoured with of publicly acknowledging the deep sense of the obligation which, in common with all men of science, and more especially the cultivators of natural history, I feel towards the distinguished traveller we have this day assembled to honour. (*Cheers.*)

During the long and painful journeyings by which the great geographical discoveries were made that place the name of LIVINGSTONE among the foremost in that science—though harassed by every difficulty, enfeebled by sickness and encompassed by dangers—in perils of swamps and waters, in perils of noxious and destructive beasts, or of crafty and hostile men—yet no phenomenon of nature, whether meteoric or living, appears to have escaped the clear glance and self-possessed cognition of the determined explorer. (*Loud cheers.*)

In regard to zoology, I must state that I never perused the work of any traveller from which I had to take, from the same number of pages, so many extracts of new and original notices of the living habits of rare animals, as from the volume of African travels of which Mr. Murray now announces the “Thirtieth Thousand.” In this work the South African colonist and the entomologist are alike benefited by the most precise and authentic evidence yet obtained of the terrible tsetse-fly, and its fatal effects on the ox, horse, dog, and other animals indispensable to colonising progress. The scientific staff about to accompany Livingstone in his second exploration of the Zambesi will doubtless, aided by his experience, clear up all the mystery of this most extraordinary property attributed to an insect no bigger than the house-fly. In the same unpretending volume we find a rich store of new facts in natural history, told with the charm of direct transcript from nature, and with the raciness of original power, and that humour which is so often the concomitant of great and simple minds. In regard to the singular economy of the ants and termites, with what interest we read of the unhooking of the wings by the insect itself after the nuptial flight, when the bride, her one holiday-excursion ended, lays down her “limber fans” of glistening gauze, and betakes herself henceforth to the duties of domestic life,—of the untiring activity of the workers, under the scorching sun, which unwearied-

ness the deep-thinking Traveller illustrates by comparison with the beating of the heart, perhaps unconscious of the profound physiological truth embodied in this comparison of insect movements with the involuntary or reflex muscular action in higher animals! How mysterious seems that power of most rapid diffusion of a subtle penetrating effluvium, which Livingstone notices as the defence of certain ants, with experimental determinations of distance and rate of progress of the emanation! (*Applause.*) The same faculty of exact inquiry is manifested in the experiments, which remind us of those of Hunter—born, like Livingstone, in the parish of Kilbride—by which our traveller determined the independent source of the fluid secretion of the tree-insect, from which it dripped in such extraordinary quantity, both whilst attached to the twig and when insulated from its sap-vessels. The ornithologist has wondered at the seeming monstrous beaks of the hornbills, little dreaming of that strange economy manifested in the voluntary imprisonment of the incubating female, plastered up with her nest in the cleft of a tree, a fissure only being left through which she can protrude the tip of her long bill to receive food from her attendant mate, and he, reciprocally, poke his into the procreative prison to tempt her with some dainty. (*Applause.*)

Of the ostrich much has been written; yet we wanted Livingstone's testimony of the vocal power of the wild male, roaring like the lion, and only, as our traveller tells us, distinguishable by being heard in broad day instead of by night. (*Continued applause.*) Of the king of beasts himself the volume contains the richest storehouse of facts, from direct and varied observations of him in his native wilderness.

Perhaps, however, this is the part of our friend's book that has failed to give unmixed satisfaction to the British public. We dislike to have our settled notions disturbed by provokingly unvarnished, uncompromising assertions of facts that militate against a cherished prepossession. Some of us feel rather sore at our notions of the majesty of England's old emblematic beast being upset by the sum of our guest's opportunities of intimate acquaintance with the natural disposition and habits of the lion of South Africa. (*Laughter.*) Fearfully intimate, indeed, was part of his experience! That direful grip—which since has left one arm a dangling appendage—when the dishevelled mane of the irate monster was tossed about his victim's head, and the hot breath driven with deafening roar into his ear!—did it shake all respect for the traditional nobility of the lion out of the Doctor's mind? Certain it is, the sum of his recorded observations shows the lion to be a

slothful, skulking, cruel beast of prey,—by no means the psychical compound we have delighted to associate with our national emblem. (*Laughter.*) Perhaps, however, I have a word of comfort for those who would still glorify its type. Species differ in habits. The British lion is not a mere heraldic monster, but was once a grim flesh-and-blood reality. I have had the satisfaction of determining that the *Felis spelæa* of our Yorkshire, Somersetshire, and Devonshire bone-caves was a veritable lion, surpassing in bulk, and with paws of twice the relative size, of those of the largest living lion of North or South Africa. The old British species has passed away—at least he now only shakes his mane and roars in metaphor (*continued laughter*); but the extinct antetype may have possessed all the qualities which his most ardent admirer would have ascribed to him. (*Cheers.*)

It is hard for the naturalist, when on his favourite topic, to forbear gleaning from Livingstone's full and rich storehouse of facts about buffaloes, rhinoceroses, elephants, and so forth. But the hour reminds me that time has fled apace—quickly because so pleasantly.

Our excellent Chairman has pointedly adverted to one quality in Livingstone—his inflexible adherence to his word. (*Cheers.*) It is shown in small as well as great things. When, eighteen years ago, the young missionary was preparing himself for his task, he devoted part of his short leisure in London to studying the series of comparative anatomy in the Hunterian Museum, then under my charge. On taking leave of me he promised to bear me in mind if any particular curiosity fell in his way. Such an one did in the course of his Zambesi travels—the tusk of an elephant with a spiral curve. It was a heavy one; and you may recall the difficulties of the progress of the weak, sick traveller, on the bullock's back. Every pound weight was of moment; but Livingstone said, "Owen shall have this tusk," and he placed it in my hands in London. (*Loud cheers.*)

In the perusal of the Missionary's Travels it is impossible not to infer the previous training of a strong and original mind richly and variously stored; not otherwise could science have been enriched by such precious records of wanderings in a previously untrod field of discovery. Our honoured guest may feel assured that whilst the cultivators of science yield to no class of minds in their appreciation and reverence of his dauntless dissemination of that higher wisdom which is not of this world, such feelings enhance their sense of obligation for his co-operation in the advancement of that lower wisdom which our great poet defines as "resting in the contemplation of natural causes and dimensions." (*Applause.*)

Every man to whom it has been given to add to human knowledge looks back with grateful feelings to the school or college where he acquired his elements of the sciences. With the same feeling that Livingstone may recall the old lecture-halls at Glasgow, so do I those of Edinburgh. We may both rejoice that the natural sciences have always had so large a share of the teachings in those Universities. At the same time we cannot forget that we have both been honoured by a degree from the oldest and most classical University of England.

It is, therefore, with every sentiment of gratitude and respect that I propose the toast which has been allotted to me,—“The Universities and Scientific Bodies which have united with the Geographers to honour Livingstone.” (*Loud cheers.*)

The BISHOP of ST. DAVID's said, that nothing but a sense of duty, the duty of submission to the authority of the Chair, could have reconciled him to the seeming presumption of his standing up in that place as a representative of the Universities, and especially in acknowledgment of a toast proposed by one who ranked among the foremost of the princes of modern science. He was conscious that he had no claim to such a character but the obligations under which he lay, in common with multitudes, to one of those learned bodies. He believed, however, he might say of them, that they were doing their duty, and that there never was a time when they had been more alive to the importance of the functions with which they were entrusted, and more earnestly bent on discharging them faithfully. He would add, that they would have missed one of their highest ends if they failed to inspire those who received their training with an intelligent interest in the expedition which was about to leave our shores. (*Cheers.*)

From that expedition, notwithstanding the cautionary hints which had been so prudently thrown out, he augured the happiest results—commercial, scientific, and social. But still, however precious and brilliant those results might be, he was sure that they could not outweigh the worth, or outshine the lustre, of Dr. Livingstone's past achievement, by which he had shown the ascendancy which might be gained over uncivilized tribes by a superior intelligence, animated and guided by the principles of Christian charity. (*Cheers.*)

If anything could heighten their admiration of that great moral triumph, it might be a comparison with an expedition which had been sent out, not many years before, in another part of the same continent. The expedition to which he alluded was

sent by the Pasha of Egypt to discover the sources of the Nile. Its history had been related by a Frenchman (M. Thibaut), who accompanied it. It consisted of several barks with troops on board, and was amply supplied with all the resources which the power of the Pasha could furnish. It first passed through the territories of a warlike race, which was treated with prudent respect. Afterwards it came to those of a tribe which had not been reached by any previous voyage of discovery. The natives crowded the banks to gaze on objects which they had never beheld before; the spectacle impressed them not merely with wonder, but with awe; they regarded the strangers as beings of a superior nature; yet the brutal soldiers of the Sudan were permitted, and even instigated, to fire upon these unoffending, almost worshipping, creatures, plundered and burnt their habitations, and carried away their women and children, to be sold as slaves in the market-place of Khartum, the point from which the expedition started. Could any discovery compensate for the evil which must be caused by such a mode of exploration as this? Must not the people who had been so treated ever after associate the idea of superior civilization with injustice and oppression, robbery and wrong? And must not this contrast heighten their admiration for the traveller who had pursued so directly opposite a course, in which those who came after him could have no higher aim than to tread in his steps, and to approach, at a respectful distance, his illustrious example? (*Cheers.*)

The DUKE of WELLINGTON proposed the health of the Ladies, and especially of Mrs. Livingstone, in a few words complimentary to that lady. (*Drunk with warm cheers.*)

SIR RODERICK MURCHISON.—I now give you the last toast of the evening, and beg you to drink to the good health of the “Proposers of this Festival.”

The zealous geographers who sit at the ends of the seven cross tables are the gentlemen who have mainly contributed to make this meeting as harmonious, gratifying, and successful as it has been. (*Cheers.*)

To those good men let us return our sincere acknowledgments, and above all to Dr. Norton Shaw and Mr. Arrowsmith, for the heartiness with which they have gone to work to bring about this farewell festival to Livingstone.

I now therefore call on Dr. Norton Shaw, the untiring promoter of every movement calculated to support geographical science, to answer for this our parting toast. (*Cheers.*)

DR. SHAW, in the name of his brother stewards and himself, having returned thanks for the compliment which had been paid them, the meeting separated.

CRAWFURD'S DICTIONARY.

A Descriptive Dictionary of the Indian Islands and adjacent Countries.

By JOHN CRAWFURD, F.R.S., F.R.G.S., etc.

THIS is a work very much in the same style as the *Oesterreichische National Encyclopädie*, in which all that relates in any important degree to the region to which it refers—geographical, biographical, zoological, historical, commercial, &c.—is arranged in an alphabetical manner. Thus, to instance the very first pages, we find Abaca, Abany, Abra, Achin, Adang, Agar-agar, Agila, Agno-Grande, Albay, Alboquerque, Alforas, Alligator, Ambergis, Amboyna, &c., names immediately or nearly succeeding each other as heads of so many articles. Elsewhere we find Dog, Dory Harbour, Dragon Blood, Drama, Dress (of the inhabitants of the Indian islands), Philippine Archipelago, Pigafetta, Pilgrimage, Pine-apple, Piracy, Polo (Marco), Polynesia, &c. These headings will sufficiently indicate the general scope of this Dictionary and its very comprehensive character. It appears to embrace considerations on every subject connected with that vast and interesting region, which extends from the Bay of Bengal to the northern shores of Australia, and comprises the largest islands on the surface of the globe. It has often occurred to us that a “British” National Encyclopædia, on a plan similar to that of the Austrian, or to the work before us, relating to every portion of territory under the British crown—its geography, productions, history, and celebrated natives—might be invested with the highest interest. On the face of the earth there cannot be found a dominion comprising regions so varied in character or more abounding in natural wealth, rich seats of commerce, valuable antiquities, and a history full of remarkable events, than that empire under which we live, and upon which the sun never sets.

The qualifications of Mr. Crawford to produce such a work as this “Descriptive Dictionary,” &c., are undoubted. Thirty-six years ago, when (as he tells us in his preface) he gave to the world his “History of the Indian Archipelago,” if we except Sir Stamford Raffles (under whom he filled an official appointment in Java), Mr. Crawford was nearly the only authority for most information concerning that previously little-known region. Since that period, Hogen-dorp and some other Dutch authors have made public statements respecting the Dutch possessions in the East; and, particularly in recent years, the names of Swart, Croockewit, Schwaner, Keijser, Müller, &c., appear as authors of written works or maps to be found in our own library. Megen in the Philippines, Sir James Brooke in Borneo, and Windsor Earl in the Eastern and South-Eastern part of the Archipelago, together with a few other travellers; our own Hydrographic Office; the Royal Institution for the Language, Geography, &c., of Dutch India; the Journal of the Asiatic Society of Bengal,

a few Parliamentary Reports; the Singapore newspapers, and especially the Journal of the Indian Archipelago, edited by Mr. Logan, have contributed further information respecting different parts of this vast region. But no one that we are aware of, excepting Mr. Crawford, has ventured upon the labour of producing a systematic and comprehensive work on the subject, such as his 'History of the Indian Archipelago' and the volume before us. Doubtless the author has availed himself of all the foregoing sources of information, in addition to his personal knowledge of this part of Asia, and the researches which he had already made previously to the appearance of the works above indicated; and the result is a *catalogue raisonné* in reference to the islands of the Eastern Seas and adjacent countries, which ought to find a place in every geographical library.

As might be expected, the countries personally travelled in by Mr. Crawford are those which he has treated of at the greatest length. It is well known that he was more than thirty years ago a special envoy from the British Government to the courts of Anam and Siam, and on behalf of the British Sovereign concluded the treaty with the Burmese after the invasion of the empire of Ava in 1826. Accordingly, he has introduced into the Dictionary lengthened articles on Siam, Cochin China, and the adjacent countries, respecting which he is certainly one of the chief authorities, or we might more properly say, our principal and most trustworthy informant. He has also given a very extended and valuable account of the important island of Java, where he resided and held a distinguished position under Sir Stamford Raffles during its occupation by the British from 1811 to 1816; and he has treated to an adequate extent of Singapore, in which thriving settlement he is, we believe, a landed proprietor, and in which he succeeded Sir S. Raffles as governor.

We shall enter into no disquisition on the ethnological researches of our author, as with some of his conclusions many readers may not feel inclined to accord; but we cannot overlook the acuteness and value of some of his etymological remarks with which the Descriptive Dictionary is abundantly interspersed, and which our learned fellow-member is rendered highly competent to make, by his knowledge of some of the living languages of continental India, where Mr. Crawford resided for a considerable length of time.

In several of the articles old and long-persistent errors are for the first time corrected. Thus, for instance, the island known in maps as Gilolo, is described by Mr. Crawford under the name of "Almahera," as its proper appellation—Gilolo, or Jilolo, being merely the name of a bay and of a kingdom on the western side of the northern limb of the island in the time of the early Portuguese writers. On another hand unwarranted innovations are exposed. The name of Tanah-Kalamantan, or "Land of Mangoes," which has of late found its way into some books as applied at large to the great island of Borneo, is stated by Mr. Crawford to be only a Malay term, and a mythic, and neither a popular nor well-known name for that country.

Mr. Crawford, in many parts of this work, vigorously denounces the "violations of the sound principles of commercial policy" (p. 191), which, prompted by rapacity, the conquering European nations, the Portuguese, Spaniards, English, and Dutch, have more or less adopted in the Indian Archipelago. The production of its great staples—rice, spices, tin, &c.—has, as he shows, been fettered and cramped by the most narrow-minded and tyrannical regulations. As respects the clove, for example, and the periodical destruction of the trees producing it in islands beyond the Dutch dominion, Mr. Crawford remarks, "The Dutch Government has only to pursue a course exactly the reverse of that which it has followed for two centuries and a half, and it will be right. . . There seems no good reason to doubt that the consumption of cloves might, with equal cheapness and freedom, become co-extensive with that of pepper" (pp. 104-5). With respect to the production of tin in Banca, the author

adduces arguments against an ill-judged policy of a monopoly of the produce; and as to the general principles which have guided the European nations as regards the Eastern Archipelago generally, he says (p. 20), "All the four nations, for three long centuries, acting on a false and rapacious commercial theory, in so far as that theory is concerned, may safely be said to have marred, instead of promoted, the industry and civilization of the native inhabitants; and it is only within the present century that a wiser and more generous policy, not fully carried out by some of the parties even now, has been adopted." This stricture, founded as it is upon a personal acquaintance with the countries in question, is anything but creditable to Christian nations.

Some curious details are given under the head of "Krama," which is the name of the "polite dialect," or "ceremonial language" of the Javanese. In this idiom it seems that the great object to be attained has been the avoidance of all words and forms of expression to be found in the vulgar tongue. If a word should have become familiar, it is rejected from the ceremonial language. It is as if in our own country we were always to use words derived from the Greek, Latin, or French, in preference to those of Anglo-Saxon origin, and which are popularly understood—a practice which is not unknown under the latitudes and longitudes embracing the British islands. The general prevalence of such a dialect would tend to prove the correctness of the axiom attributed to Talleyrand—that language was given to man not so much to express his thoughts, as to hide them in obscurity.

Under the head "Grobogan," which is the title of an ancient kingdom, and now of one of the districts of Java, Mr. Crawford, on the authority of Dr. Horsfield, gives us an excellent description of the remarkable phenomenon of a mud-volcano. The author is wrong, however, in instancing it as "singular," since a similar expulsion of mud from beneath the surface of the earth takes place at Maccaluba, in Sicily, and is well described by Captain Smyth in his valuable work on that island. In treating of Papandayang, also in Java, Dr. Horsfield (Dict., p. 327) has stated that this, which was formerly one of the largest volcanoes in the island, was for the most part swallowed up in the earth in 1772, an extent of high ground, fifteen miles in length and fully six broad, being thus engulfed. Such an event is obviously exactly the converse of the elevation of the volcano of Jorullo, in Mexico, in 1759, as described by Humboldt,* and of some subsequent upheavings of volcanoes in Central America. Next to the upheaving of Jorullo, which is unquestionably the most stupendous natural phenomenon, of which we have any record, that has occurred during the historical period, may be instanced as amongst the marvels of nature the vast eruption of the volcano of Tomboro, in the Indian Archipelago, in 1815.

* A concise account will be found in M'Culloch's Geog. Dict., ii. 91.

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1858.

Fifth Meeting, Monday, January 25th, 1858.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

ELECTIONS.—*Captain Howard C. Elphinstone, R.E.; Thomas Joseph Hutchinson, H.B.M. Consul, Bight of Biafra, Lieutenant-Governor of Fernando Po, &c.; Robert Moffat, Government Surveyor, Cape of Good Hope; Dr. Ferdinand Mueller, Botanist and Explorer of Tropical Australia; Thomas Witlam Atkinson, author of 'Travels in Oriental and Western Siberia;' and George Bishop, Jun., F.R.A.S.; Edward Burmester; Isaac Gregory; Arthur Boucher Halloran; Thomas Woodbine Hinchliff, and Charles Edward Lefroy, Esqrs., were elected Fellows.*

EXHIBITIONS.—Among the articles exhibited at the meeting were Sketches, by Mr. Th. Baines, of the North Australian and South African Expeditions; Original Tracing, by Captain W. Allen, R.N., of the Niger; Photograph of the steamer "Dayspring," recently lost up that river; Reduction of Lieutenant Glover's Chart of the Niger; Specimens for a Submarine Telegraph Cable, by M. Ballustrini.

DONATIONS.—The following were among the donations since the previous meeting :—'Summer Months among the Alps,' by T. W. Hinchliff; 'Annales de l'Observatoire Physique Central de Russie;' Blackie's 'Imperial Atlas;' the 'Transactions of the Geographical Society of Bombay;' and Charts from the Hydrographic Office of the Admiralty, &c.

ANNOUNCEMENTS.—The President stated that he had received from the Hydrographer information to the effect that the "Sunbeam," with a fresh supply of instruments, presents, and other articles, had sailed the day before from Liverpool for the Niger, to replace the "Dayspring," lost near Rabba.

The Papers read were :—

1. *Progress of the British North America Exploring Expedition, as far West as long. 109° on the Lower Saskatchewan River.* By Captain JOHN PALLISER, F.R.G.S.

Communicated by the Rt. Hon. H. LABOUCHERE, M.P., F.R.G.S., H. M.'s Secretary for the Colonies.

Montreal, Canada East, 8th Dec., 1857.

SIR,—In continuation of my Report of the 27th July, 1857,* I have the honour to inform you of the farther progress of the British North America Exploring Expedition.

On September the 28th I arrived at San Josef, an American town about 7 miles south of the British frontier line. The population consists of British as well as American half-breeds, whose chief dependence is on the proceeds of the buffalo hunt; and, while the more youthful part of the male population are away on the hunt, the then defenceless inhabitants are subject to the inroads of the Sioux Indians. These Indians last year attacked that settlement, stole almost all the horses, and shot a woman and the schoolmaster: indeed, hardly a year passes without some similar depredations. Although that bend of the Pembina River, on which San Josef is situated, is inside the United States' territory, yet the greater part of the river's course is through the British dominions. It is an important river, and may hereafter prove valuable, as affording facilities for navigation. I have, therefore, had its course correctly laid down in our charts.

On the 4th August we reached Turtle Mountain, a hill rising out of the prairie to about 300 feet; it is 30 miles long, 10 broad. This hill is one of a series that we have since traced scattered irregularly in a line from south-east to north-west. The boundary line passes through the summit of this mountain, throwing the "Souris" or Mouse River into the British possessions. This river has hitherto been wrongly laid down in all maps; and I have, therefore, also paid strict attention that its course should be carefully laid down in our charts.

August 15th.—We reached Fort Ellice on Beaver Creek. Here I found the men I had sent direct from Fort Garry with the ten horses, and, as they had now rested more than a week, I took these ten horses on an expedition to "La Roche Percée," leaving the horses, that had been hitherto travelling with myself, to recruit.

Proceeding on a south-west course from Fort Ellice, we arrived on the 18th of August at Moosé Mountain, one of the chain of hills

* See Proceedings, No. I., vol. ii.—ED.

above mentioned. It, like the Turtle Mountain, is covered with dense woods, lakes, and swamps.

On the 20th August we arrived again on the Mouse or "Souris" River, and here Dr. Hector first discovered coal of a very fair quality. From this point of the Mouse River an hour's ride brought us to the "Roche Percée." A singular appearance is here produced on the rocks and stones by the combined action of the atmosphere and water; the layers of sand and clay forming these, being unequal in hardness, are worn accordingly into grotesque shapes, affording more astonishment to the Indians and half-breeds visiting the spot than interest to the geologist on a more close examination.

Here I was visited by a large number of Stone Indians, celebrated as the greatest horse-thieves in the country: however, I concealed all apprehension for my horses. I also discovered that meat was a very scarce article among them, as they had not fallen in with buffalo for many days. I had, however, been fortunate enough to kill two bulls that morning, and secured their good offices and the safety of my horses by giving them the meat, inviting them to cook and prepare their own feast, to which I added some tea, sugar, and flour, desiring them in return to guard my horses all night, which injunction they regarded as a compliment, and faithfully performed.

The following day we returned, and reached Fort Ellice on the 25th of August.

On examining the horses I had left behind at this post when I started for "Roche Percée," I found them not sufficiently recruited to proceed westward to the Elbow: I therefore determined to wait a few days longer. I likewise found that my guide and interpreter was so frightened at the prospect of entering the Blackfoot country, that he gave me very false interpretation as to the facilities of the route I intended (according to my instructions) to adopt. I therefore started a messenger to Mr. Christie, the chief officer of the Hudson Bay Company, requesting the services of Mr. M'Kay (the officer in charge of Fort Ellice) as an interpreter to accompany me on the expedition. Mr. Christie, on receiving my letter, rode three days' journey to meet me at Fort Ellice, and brought with him a gentleman to put in Mr. M'Kay's place, thereby placing the valuable services of the latter at my disposal. In the mean time, on the 7th of September, finding my horses sufficiently rested to resume operations, I started the expedition under Dr. Hector for the "Qui Appelle" lakes, and remained behind at Fort Ellice until I should see or hear from Mr. Christie, whose subsequent arrival on September 9th, set Mr. M'Kay at liberty; and, after accounts were

made up and transferred, I started on horseback, accompanied by M^cKay and two of my men (who had remained behind for the purpose), and overtook the expedition in three days at the Qui Appelle lakes, about 135 miles west of Fort Ellice.

On Sunday, September 13th, we remained at the Qui Appelle lakes. Here the Hudson Bay Company have a small trading-post, the most western fort in the territory; and there we found a large camp of Crees arrived for trading. I sent for Mr. Pratt, the missionary, requesting him to come and pay us a visit. He is a pure Cree Indian, educated at Red River. He reports the Crees as beginning to apprehend scarcity of buffalo, and many are most anxious to try agriculture. He thinks that if they had agricultural implements, such as spades, hoes, and ploughs, they certainly would commence operations. This opinion I found pretty general among the people of the Hudson Bay Company; and I am persuaded much good could be done by importing the simpler kinds of agricultural implements. Pratt has set the Indians an excellent example himself, and grows capital Indian corn, barley, and potatoes. The Qui Appelle lakes may be considered the most western part of the territory east of the Rocky Mountains to which the Hudson Bay Company trade: westward of this I may say is unknown, and the whole country in this latitude is untravelled by the white man.

Among the Indians that had come to trade was a man Mr. M^cKay was acquainted with. This man was a remarkable exception to the generality of Indians: they call him the "peace-maker," and twice within the last two or three years he pushed his way alone into the Blackfoot country, and walked into the enemy's camp unarmed, with the peace-pipe in his hand, exhorting them to peace, and offering them the alternative of killing him. The result on each occasion was a treaty of peace to the Crees and a present of horses to the peace-maker. I engaged this Indian to guide us to the Elbow.

On September the 14th we started from Qui Appelle lakes for the Elbow, on the south branch of the Saskatchewan, sometimes called the Bow River. On September 16th we again camped on Mouse or Souris River, at a tributary called by the Indians, Moose Jaw Creek, in longitude 106°. Up to this point in our journey we had suffered no inconvenience from want either of wood or water; here, however, our guide, the peace-maker, advised us to bring wood along in our carts, as we should see no more until we came to the Saskatchewan, which we first came in sight of at sunset on the 21st of September.

We were now in the heart of the buffalo country. This region

may be called a buffalo preserve, being the battle-ground between the Crees and Blackfeet, where none go to hunt for fear of meeting enemies, and where those who go to war abstain from hunting. The whole region, as far as the eye could reach, was covered with buffalo, in bands varying from hundreds to thousands. So vast were the herds, that I began to have serious apprehensions for my horses, as the grass was eaten to the earth, as if the plain had been devastated by locusts. However, the timber on the small tributaries of the river kept off the buffalo, and so a little grass was obtained for the horses, for the buffalo shuns the timber until mid-winter.

At the Elbow I found a large tributary flowing from the east into the Saskatchewan, and I dispatched Dr. Hector with one or two men to trace the course of this river, which I find flows from the most western of the chain of Qui Appelle lakes, being navigable to large boats the whole way. Hence I have been able to ascertain that there exists a valuable water communication between the south Saskatchewan and Red River, and that a good-sized boat, and even a small steamer, might descend from the south Saskatchewan, ascend to the west Qui Appelle river, cross the Qui Appelle lakes, and then descend the Qui Appelle into Red River.

After the Doctor's return from exploring the western Qui Appelle, we commenced our ascent from the Elbow, and reached the 109th meridian of longitude on the 28th of September. This magnificent river rivals the Missouri in size and volume, and even at this (the lowest state of water during the whole year) was navigable for craft of any size, as I found by sad experience, having been so unfortunate as to lose one of my waggons in the channel of the river at a depth of sixteen feet, where I subsequently crossed it. All particulars of this river—its timber, capabilities, &c.—will be found in my journal, which I hope to have the honour of forwarding to England next spring. The 109° meridian is the farthest point to the westward that I have this season explored. At this point I crossed the river to the north side, and started on a north-east course for Carlton, my winter quarters, where we arrived on the 8th of October.

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I started from Carlton (Upper Saskatchewan) October 11th, reached Touchwood Hills October 15th, Fort Pelly October 18th, Fort Ellice October 23rd, and on the 1st of November arrived at Red River. This portion of my journey was very cold, accompanied with snow almost every day, yet not sufficient to delay me or cause me much inconvenience. At Red River I found very great

difficulty in obtaining horses and a guide to Crow Wing, Minnesota territory, but at length succeeded, for the sum of 65*l.*, in obtaining the services of a half-breed named Robert Tate, and his horses, to take me there, a distance of about 520 miles. For this sum I was supplied with a horse to ride, besides the horses necessary to carry our baggage, bedding, and provisions. Unfortunately my horse was killed at Pembina, and I had to go on foot about 450 miles of the way: the snow, however, was so deep, and the weather so cold, that it did not much signify; and we arrived at Crow Wing on the 19th of November.

From Crow Wing there is stage conveyance to St. Paul and Prairie Le Chien, partly by coach and principally by waggons and sleighs. At Prairie Le Chien is the railway terminus, from which I proceeded *viâ* Chicago and Detroit to Montreal.

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While I was at Red River on my way to this, I made my arrangements for proceeding next spring with the expedition, by engaging twenty men, and ordering them to proceed on the 10th of March, 1858, with a sufficient number of dog-sleighs to convey their provisions up to Carlton House, in order that all may be in readiness for as early a start as the season will permit. My course will be, in the first instance, to visit Eagle Hills, and thence to strike for the south branch of the Saskatchewan, and renew my explorations at that point where I left off at the end of September. I regret that I am obliged to engage so many men, as their pay and small rations will increase the expense of the expedition; but with a smaller number it would be the height of imprudence to venture into the south-western part of the Blackfoot and Peagan country. A smaller number would only invite the Indians to attempts on the horses. It is true I have hitherto only travelled with thirteen men, but the Indian camps I have met (with one exception, at Roche Percée) were small ones; next year the camps I shall fall in with will be much larger, and to meet this I must increase the number of my men to thirty in all, viz., four men at Carlton, one man at Red River still under pay, five at Carlton to commence pay on April 1st, 1858, at 15*l.* for six months, and twenty from Red River to commence pay March 10th, 1858, at 20*l.* for six months. After this dangerous country shall have been traversed, much fewer men will suffice, by returning to the settlement on the Hudson Bay Company's beaten track, *viâ* Edmonton. But the country the expedition will have to traverse next year, in order to fulfil its objects, will be so dangerous, that it would be impossible to fulfil my orders

of sending the expedition back in time to reach St. Paul in the fall of 1858.

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THE PRESIDENT.—You will agree with me, Gentlemen, that Captain Palliser is admirably qualified for such a difficult enterprise as the one he is proceeding on. He is a capital buffalo hunter, thoroughly inured to everything that a man can suffer in North American travel, well practised in all the sports of the country, and a man of great strength and endurance. I am sure he will realise all those objects which the Royal Geographical Society had in recommending him to Her Majesty's Government. I am in hopes that next year this expedition will proceed towards the Rocky Mountains, and come into direct communication with the other expedition under Captain Hawkins, R.E., which the Government is about to send out to explore the boundaries between the United States and the British territories. We have among us on the present occasion gentlemen who are acquainted with this territory, and among them my old and distinguished friend Mr. Featherstonhaugh, who, with Colonel Mudge, was employed on that frontier in 1846.

MR. FEATHERSTONHAUGH.—I did not know on entering the room that this Paper was to be discussed; but Sir Roderick having called upon me, I rise to observe that I have been at various times in different parts of the country laid down in the map, but have never penetrated west of Lake Winnipeg, in the direction of the Rocky Mountains, where Captain Palliser proposes to go next year. I have, however, crossed from the Mississippi to Red River, and thence to its junction with Lake Winnipeg. Lord Selkirk planted a colony of Scotchmen at Pembina: those I saw appeared to me to be industrious and meritorious men, fitted to contend with a rigorous climate, and who by ingenuity and economy could flourish in despite of it. They had ploughs and other agricultural implements, and had barns full to repletion with barley, but could get no market for it. The potatoes were excellent; I never ate better. Beef cattle they had not as yet, as they could supply themselves with buffalo meat. Hereafter they will have cattle; for where you can have barley and potatoes you can have domestic animals. Some of these men spoke to me of the coal they had found in the neighbourhood; and, as an old geologist, I should certainly have gone to the locality, but winter was at hand, and I was obliged to hasten out of the country.

Before I take my seat I will, if I am permitted, briefly allude to some considerations of a more general character. It is known that, under the dominion of Great Britain, in North America, there is a vast region, extending from the United States frontier north, and from the Atlantic to the Pacific. This immense territory, including the Canadas, Labrador, and the possessions belonging to and frequented by the Hudson Bay Company, is much larger than the United States. This expedition of Capt. Palliser, sanctioned by Her Majesty's Government, and so cordially encouraged by the Royal Geographical Society, leads naturally to the discussion of a question of great public interest, viz., whether this imperial domain is capable of sustaining an industrious population? For several degrees beyond the most northerly part of the frontier of the United States this question may be answered in the affirmative. In the valleys I remarked a great fertility of soil, proper to the cultivation of barley, oats, a peculiar kind of Indian corn that ripens in eight weeks, called Mandan corn, and potatoes. Nothing is more nourishing to cattle and sheep in the winter than the sweet fodder of Indian corn. Farther north the short summers are not favourable to cultivation; but wherever settlers are in possession, they will soon find their way to the deposits of copper and other valuable minerals; and such is the facility of water communication, that these will in time be brought to the settlements and exchanged for provisions

and other necessaries with the inhabitants to the south, living in milder latitudes. I look upon this exploring expedition of Capt. Palliser as highly meritorious; it will open up a territory of whose physical geography and intercommunication and juxtaposition of streams we are at present ignorant, but the knowledge of which will be hereafter highly useful.

With reference to the approaching extermination of the buffalo, the Indians are to blame. Ever since white traders went amongst them, they kill the buffaloes wherever they meet them—not for food, but to sell their skins. In prairies 160 miles in extent I have seen in every direction skeletons of buffaloes slain in this destructive manner.

I desire to conclude these remarks with my conviction, derived from a long experience of the progress of mankind under nearly similar circumstances, that industrious colonists in those regions would in time establish a regular and profitable commerce favourable to the interests of Great Britain.

COLONEL LEFROY, F.R.G.S.—I only rise for the purpose of adding my testimony to the valuable contribution to our knowledge of that region which has been given us by Mr. Palliser: one more substantial than we have had from any other source for a long period. I leave to geologists to estimate the value of the discovery of coal, which I have a vague recollection of having heard of when I was in the country. But what impressed me most was the discovery of a navigable water communication between the Saskatchewan and the Red River by means of the Qui Appelle waters. They seem to traverse a large extent of country, and if the discovery be substantiated, will greatly facilitate our means of communication with those western regions towards the Rocky Mountains; but it will hardly be safe to assume that the depth of water found by the travellers where they sounded is to be met with generally along them, the Saskatchewan itself being full of shallows. I differ from many as to the destination of that region with regard to the support of an increasing population. I am one of those who think it never can support a dense agricultural population, or one in any degree comparable with that of Canada. But there is a fact mentioned by Mr. Palliser which struck me: it is that he found Indian corn ripe at Fort Ellice. I believe Indian corn has not been found to ripen with any certainty on the Red River. It is a very interesting point to find within the limits of the British territory a region where it will do so. With regard to the abundance of buffaloes spoken of, it was mentioned to me as a positive fact by Mr. Heriot, that a brigade of boats was delayed three whole days in going up the river in consequence of the immense herds of buffalo crossing the stream. This was in 1841 or 1842. In all these respects Mr. Palliser's account agrees with our previous information, and he has added to it most materially. It must be gratifying to this Society to have been the means of sending out a traveller so observant and intelligent.

The PRESIDENT.—I may observe, with reference to this expedition, that Captain Palliser is accompanied by two or three men of science of considerable distinction. Dr. Hector is a good naturalist and geologist; Mr. Sullivan is a gentleman capable of making physical and astronomical observations; and our Associate Lieutenant Blakiston is making all the magnetical observations. So that we may hope for considerable additional results. The main feature of the present communication is the discovery of this remarkable water-shed, proceeding from the Qui Appelle lakes—the waters flowing both to the east and west. It was previously unknown to geographers, who must see the importance of this discovery, as regards the future destiny of that country, in the facility it may afford for the transport of merchandise to and from the interior.

The second Paper read was :—

2. *Description of the Amúr River in Eastern Asia.* By M. A. PESCHUROF,
of the Imp. Russian Navy.

Communicated by Capt. JOHN WASHINGTON, R.N., F.R.G.S., Hydrographer.

[This Paper will be printed in full in the Journal, with a Map.]

THIS account of the Amúr is little more than a picturesque description of its banks, for it is accompanied by few data of any scientific value. This great stream, of 1500 miles in length, is traced from its origin in the two rapid rivers, Shilka and Argum, whence it forces its way through the spurs of the mountain-chain which borders it, whose flanks are dotted with the remains of larch, fir, and white willow, that have been stripped and felled by the nomad tribes, for their encampments. Its banks are mossy rock, almost destitute of earth, and at every valley a copious rivulet runs in. The Amúr valley widens out as the beautiful meadow lands are reached, on which the ruins of the ancient Cossack town, Albazin, are situated. (Albazin was besieged and taken by the Chinese in 1686, and subsequently demolished according to treaty.) Numbers of islands, now increasing to archipelagos, give a peculiar feature to the river, and the birch begins to appear near to the confluence of the Kamara river. This is the head-quarter of the nomad tribes, for the banks of the Kamara abound with fur animals, and the people, near its confluence with the Amúr, cut wood and float it down the latter river. The most northern Manchur guard station is established at this place. The river Zeya bounds the mountainous districts of the Amúr, and here the floating wood is caught and built into rafts. The river now runs through broad plains grazed by cattle and cultivated in patches, with Manchur villages dotted along its banks, amongst which is Aigun, the harbour and yard of the Chinese Manchur fleet, comprising about thirty serviceable one-masted vessels. Hereabouts the oak and elm begin to be found, and the confluence of a large river, the Buruja, is next reached.

At Cape Sverbéef the rapid course of the Amúr begins. It cuts through a chain of high mountains, runs in some places at 5 knots an hour, and has a pretty uniform depth of 4 fathoms. Its width is not stated.

Two islands terminate the rapids; beyond them are plains, alternately richly wooded and dreary, and then archipelagos of islands to beyond the confluence of the large river Sungari, whose upper banks are very populous, and whose efflux makes the water of the Amúr far more turbid than before. When the Usuri river is passed,

the islands become exceedingly intricate, and there is a large sturgeon fishery. Beyond St. Cyril island, comes a broad reach, and next, diverging arms, and lastly, through a single and a narrowing channel, the Amúr joins the sea.—F. G.

THE PRESIDENT.—We are so fortunate as again to have among us this evening a distinguished traveller in Siberia, Mr. T. W. Atkinson, and I hope he will give us his opinion on this memoir, the value of which is great; as all the positions have been fixed by astronomical observations made by officers of distinction in the Russian service.

MR. ATKINSON, F.R.G.S.—Sir, I have visited the sources of the Amúr, and if you will permit me at some future time, I shall be glad to send a paper to the Society, in which I shall be able to explain and give a much better description of the country I have visited, than I could do at so short a notice.

Sixth Meeting, Monday, February 8th, 1858.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS.—*The Hon. W. Napier, Lieutenant A. H. Gilmore, R.N., and Mr. James Young were presented upon their election.*

ELECTIONS.—*Lieutenant J. A. Napier Hewett; the Rev. Anthony W. Thorold; Thomas Brown; Frederick D. Goldsmid; and George Seymour, Esqrs., were elected Fellows.*

The first Paper read was—

1. *Report of an Expedition to explore a Route by the rivers Waini, Barama, and Cuyuni, to the Goldfields of Caratal, and thence by Upata to the Orinoco.* By Sir W. H. HOLMES and Mr. W. H. CAMPBELL.

Communicated by the FOREIGN OFFICE.

SIR W. HOLMES and Mr. Campbell sailed from the river Demarara to the mouth of the Waini on August 27th, 1857, whence they made a boat excursion along the Mora Creek to the Barima River, in order to obtain the assistance of Indians for ascending the Waini. The Mora is a natural navigable canal, of 50 or 60 miles long, connecting the Barima and Waini: it might be turned to good account, for its banks are heavily timbered, but its channel is now choked with stumps and fallen trees. The schooner was taken up the Waini as far as the mouth of the Barama River, up which the party proceeded in canoes on September 6th, carrying provisions and articles of exchange. This river was rapid and remarkably tortuous, and the travellers could not reach the Dowaicama cataract and portage till the 12th. This river, the Waini, and the Barima, run through forests of immense timber; Sir R. Schomburgk never saw trees so

gigantic as those along the upper course of the Barima. On the 15th they came to an Indian path that led to the Cuyuni, at a distance of two or three days, through an undulating country, and followed it on foot, but owing to various delays they did not reach the Cuyuni till the 26th. They found this river to be about 500 yards wide, and containing a considerable body of water, though at a distance of 200 miles from the sea. They now started in a flotilla of "wood skins" which had been ordered to meet them. There were numerous rapids in the Cuyuni which caused great delay, but on October 1st they reached the mouth of the Curama River, which was blocked up by drift timber, otherwise it would have afforded the best line of route, as it passes only 30 miles from Caratal. It flows from the high savannah lands, and forms a natural outlet, that admits of being turned to account, for the produce of that immense and admirable grazing country. On September 30th the hills by the side of the Cuyuni became more mountainous, and more covered with blocks of quartz, and they gradually rose into the Ekreku range, about 2000 feet high. The scenery was striking, the atmosphere drier than elsewhere in Guayana, and the climate genial. On October 7th the Cuyuni was left, being still 300 yards wide, and the Yuruan was ascended: this tributary was about 200 yards wide. After 8 miles the mouth of the turbid Yuruari was reached: it was 150 yards in width, and was infested with a perfect plague of sand flies. The party ascended its stream: they reached the first savannah on October 9th, where the river ran, fringed with a narrow bush, through thousands of acres of pasture land totally unoccupied. Cattle farms began to appear as Tupuquen was approached; they had mostly belonged to the late Colonel Hamilton, who owned a vast tract of land in this neighbourhood.

The party were politely received by the Alcalde of the mud village of Tupuquen: it was formerly a missionary station, and is now chiefly tenanted by persons connected with the diggings of Caratal, from which place it is 6 miles distant. Caratal was reached by the party on October 14th.

The diggings consist of about 50 thatched lodges, for the most part without walls, and tenanted by from 120 to 200 diggers. There are no goldfield laws here, but each man can dig where he likes. The community appeared an honest one, but very sickly. In the process of gold-seeking, the bush has first to be removed, then the upper soil, then a hard subsoil which requires the pickaxe, and at 10 or 15 feet the "Graja" is reached. This is a layer of earth, clay, quartz, and iron stone, in which the gold is found. Below it is stiff clay. In most cases the miners fail in meeting with the

Graja: either they come upon solid rock or are flooded with water. The successes at the diggings appeared in no way commensurate to the hardships. Every man suffered from fever, and many from *béche* (inflammation of the lower bowel). Vermin of all kinds abounded. The usual diet was beef dried in the sun.

On October 18th the travellers started for Upata, which they reached on the 22nd, passing through Guacipata, and crossing a wide savannah with fine park-like clumps of trees, and dotted with hills, covered to their summits with verdure. The natives were as hospitable as their means admitted, but it was strange that in this pastoral country, milk and cheese were found to be rarely used, and butter was altogether unknown. Milk had the reputation of predisposing to fever. The ordinary food is dried meat and cassava bread. The whole country abounded with quartz (Sir W. Raleigh's "*el madre del oro*"). Las Tablas was reached on October 25th: it is the port of Upata, as regards the Orinoco; thence they boated to Barancas in 12 hours. This town was surrounded with lagoons that were then drying up: its inhabitants suffered much from fever, and from this time fever began to attack all the members of the expedition, though they had previously enjoyed perfect health. Dr. Blair, one of their number, died of it.

Thirty or forty Indians, of various tribes, had accompanied the party throughout their journeyings, and they are much praised for being honest, willing, and easily satisfied. The opinion of Sir W. Holmes and Mr. Campbell is, that the districts of the Waini, Barima, and their tributaries are worthy of a much closer investigation than either their time or experience enabled them to give.

Mr. Bratt started for Caratal very shortly after the above-mentioned travellers. In his tours of inspection he passed along three different routes to the diggings, and found in all of them the same repetitions of wet alluvial land, dry arenaceous savannah, stunted trees, coarse grass, large quantities of quartz lying about in all directions, and a remarkable absence of animal life. He estimates the number of men in constant work at 130, and the yield of gold at 100 oz. per week. He does not think that Caratal is, by nature, an unhealthy place.

Mr. James Shanks, surveyor, left George Town on October 3rd, and reports his belief that the climate of Caratal is fatal: he estimates the yield of gold at less than 80 oz. per week. If any trade should arise between Venezuela and Guayana, he believes the course it would take would be along the left bank of the Yuruari and alongside the Cuyuni; water navigation being, as a general rule, impracticable on these rivers. He considers that the colony of British

Guayana possesses natural advantages for pasturage and cultivation that are equal, if not greater than those of any ground in the far interior.—F. G.

The PRESIDENT: We return thanks to Sir William Holmes and Mr. Campbell for this very clear description of a country that they have traversed, and also to the Earl of Clarendon, our constant friend, for sending us this interesting communication from the Foreign Office. You will all recollect that the person to whom we are most indebted for a knowledge of the great territory adjacent to the country now explored is Sir Robert Schomburgk, a gold medallist of this Society, and formerly our Consul at St. Domingo. The subject is one that would have interested you infinitely more a few years ago; for the quantity of gold now found in the adjacent province of Venezuela would then have astounded most people, whilst it now passes for little. In fact, the description of the country accords with the accounts we have from all gold countries. The gold is found in the broken detritus of the country, at a few feet below the surface, as we know to be the case with a great number of the gold diggings of Australia and California. We are much obliged to these gentlemen for their interesting communication and their accurate account of the physical geography of the country. There was only one geological slip in the paper. The authors alluded to the country being of volcanic origin, and immediately afterwards spoke of a great deal of quartz. I beg leave to say that volcanoes and quartz rocks have no natural connexion.

MR. JOHN CRAWFURD, F.R.G.S.—I agree with you entirely in thinking the paper is very well written. Notwithstanding this, I have a few observations and a few strictures to make. The country is very like all countries situated in the eighth, ninth, and tenth degrees of latitude in possessing enormous forest trees. These gentlemen dwell upon the value of the timber, but it would have been as well to have told us what the quality of this timber is. They have not told us whether it is fit for shipbuilding, which is the only purpose for which it could be well exported. In the next place, they state that the country is well fitted for the growth of coffee. That is not the case. In a latitude of eight or nine degrees it requires an elevation of three or four thousand feet above the level of the sea to grow good coffee. This is the case, I believe, in Ceylon. No good coffee can be produced at the low elevation of a thousand feet.

DR. SHAW.—They report a mountain two thousand feet high.

MR. CRAWFURD.—That is the top of the hill; whereas to cultivate coffee we must go to the sides of the hill. I do not believe it to be an extremely fertile country. It is not volcanic, and you seldom find a country fertile that has not a considerable share of volcanic formation. Australia is a case in point. With respect to the gold, it is not at all to be regretted that the country does not belong to us, for its productive powers seem to be far inferior to both California and Australia. But, supposing the territory had been ours, it would have been impossible to introduce any kind of labour. What kind of labour could we get? I know there are gentlemen here partial to Australia as a penal settlement, who would say that Europeans might settle in this country. I am perfectly certain they never could. The Red Americans are totally unfit for labour. To employ negro labour, we must have slavery, and that we should never consent to; and, as for Chinese labour, it is very costly, and the people very offensive.

The second Paper read was—

2. *Journey from Little Namaqualand Eastward along the Orange River, the Northern Frontier of the Colony, &c. With Map.* By Mr. ROBERT MOFFAT, F.R.G.S.

Communicated by the COLONIAL OFFICE.

[This Paper will be printed in full in the Journal with Map.]

THE position of Gams, Mr. Moffat's starting-point, was obtained by a running triangulation from Mr. Maclear's northernmost beacons. For the rest, his latitudes were obtained from stars on either side of the zenith, and his bearings by a theodolite, but the state of his chronometer precluded any observations for longitude. His survey has fixed the lateral limits of the course of the Orange River, and determined certain special points, such as the mouths of the Aintas and the Hartebeest Rivers.

The physical geography of the Orange River district is described in detail. Mr. Moffat considers that a substratum of metamorphic rock extends in a basin from about longitude $20^{\circ} 30'$ to longitude 25° ; its lowest point being at longitude $22^{\circ} 30'$. That this rock was formerly covered by a thick sandstone deposit, now so largely denuded that little remains to attest its existence on the western side of the basin, except the Noup plateau, to which he ascribes a height of about 4000 feet. The hills adjacent to it are formed by protruded greenstone, and certain depressions in this basin are filled with deposits of later dates. Many geological particulars are also given of the country onwards towards Kuruman, and the features of the great cataract of the Orange River are minutely described. Mr. Moffat remarks, in such of the horizontal formations of South Africa as he has examined, that the volcanic rocks have simply had the effect of hardening those parts of the strata they have pierced. A result of this is, that all outliers of plateau ranges composed of these rocks possess a backbone or capping of basalt, which has enabled them to withstand those denuding forces which have removed the area formerly adjoining to them.—F. G.

The PRESIDENT begged to return the thanks of the Meeting to Mr. Moffat, and appealed to Dr. Livingstone to state what he knew of the region described by his brother-in-law.

DR. LIVINGSTONE, F.R.G.S.—The country is of a very arid, sterile character; but the paper is chiefly interesting from the fact of his having visited the Falls. They were visited about the year 1815 by the Rev. John Campbell; but he did not go so far down as to have a distinct view of the chasm into which the waters of the Orange River flow. But I think he states that he threw a large stone down into the chasm, and that it was a long time before it reached the bottom. This chasm seems to be of exactly the same nature as

the fissure into which the Zambesi flows, forming the remarkable Falls called by me the Falls of Victoria. When I was in the country to the east of that, adjacent to Kuruman, I saw evidences everywhere that this country was at some former period much better watered than it is now. Everywhere you see the remains of ancient river beds, in which you find shells, washed sand, and rolled boulders, showing that at some former period they had been large, never failing streams. On one occasion I followed the course of a very large river, flowing from the north to the south. All the feeders of that stream came in a slanting direction, and it could be easily seen that the river flowed from north to south, the same as the Zambesi does at a part of its course. At last I came to the confluence of that ancient river with a large lake near to where the Orange River now flows. At the confluence there were a few hills. These hills must have caused an eddy in the stream; and in that eddy a mound of tufa—soft white limestone—must have been deposited. I examined that mound, and to my delight found a great mass of the fossil bones of animals that had lived on dry land and had happened to be killed in the water; and in floating down and coming to the eddy had evidently been carried round and round, and then sunk. The tufa had been worn away a little, and the bones were standing out in relief. I allowed my waggon to go a long distance off, and took up a few of the bones and ran after it. It was only seven years afterwards that I was able to return, but I was prevented from taking out more of the bones; those I had secured I sent to my friend Professor Owen. They were brought safely to England, and then they were stolen from the railway between Devizes and London. I never had another opportunity of getting hold of those bones. If any future traveller happens to go that way, I beg him not to forget them. Now, that large lake was let out when the fissure was formed into which the Orange River now flows. You observe in the map that the lake spreads out before it comes to the fissure; in former times, instead of being spread out in that way, it extended over a diameter of at least 50 miles. The state of Africa was then very different from what it is now. Before the fissures were made which let out the rivers and lakes adjacent to them, the extent of water in the interior of Africa must have been enormous. A process of desiccation has gone on, and there are evidences of the gradual drying up of the country. I may mention one instance observed by myself. When the missionaries first went into the Kuruman, about 35 years ago, Mr. Moffat made a dam and a canal to irrigate a garden. Not a drop of water now flows down so far as where I have seen the remains of the dam and canal. In former times the Kuruman came all the way down to the Orange River; and there are persons now living who can remember when hippopotami existed in the Kuruman, where not a drop of water now flows, and where people have been drowned. This process of desiccation has been going on more rapidly in recent times than before. The elevation of the country is probably one great cause of desiccation, but the sudden destruction of trees in late years has, no doubt, had a very decided effect upon the climate. Thousands of acres of grass are burned up annually, and every tree, not in the greatest vigour, is burned down too. In Colesberg, during the time I was there, the river dried up entirely. We ourselves made a dam and canal in the hope of growing European vegetables through the irrigation thus afforded; but the river dried up, and by-and-bye we were obliged to dig in the bed of the river for drinking purposes. Water has not again flowed in the Colesberg. When Mr. Moffat visited that country thirty years ago, he found about a dozen streams flowing that now never flow. The drying up is apparently going on towards the north.

MR. W. J. HAMILTON, F.R.G.S.—Amongst the many persons who have given us information with respect to the physical geography of the interior of Africa, there is no one who has contributed so much as Dr. Livingstone himself. It is for this reason that I venture to ask one question respecting the physical struc-

ture of the country to which he has alluded. It is a point which to many persons in this room must be of great interest. I wish to ask, with regard to the occurrence of these fossil bones in the fissure which he describes as forming the outlet to the waters of the Orange River on the west, as the fissure through which the Zambesi flows has afforded an outlet to the waters on the east, whether the formation in which these bones occur may not have been one of the original rocks of the country, instead of being formed, as he states, by the eddy of the waters themselves? There seemed to me, from the manner in which he described these bones as occurring in the deposit, evidences rather of its being the original formation of the country, and that the bones had been washed out of this deposit and not washed into it by the eddy. It is a question of great importance in a geological point of view, whether they were washed in by the water at a recent period, or whether the deposit belonged to the original soil of the country, and had been merely laid bare by the action of the water flowing through this fissure? If Dr. Livingstone could give any information on the subject, it would, I think, be very interesting.

DR. LIVINGSTONE.—The bones were not found in the fissure. The fissure is altogether distinct from the part where the bones were found. The fissure was made at the side of the large lake, and it let out the water. There was a river which flowed from the northern part of the country, and about 100 miles to the north-east of the fissure, it fell into the lake. It was at the confluence of the river with the lake and not near the fissure that the mound was formed. It might be that the water of that ancient river had excavated the bones out of the country beyond. The general character is trap, which for hundreds of miles is perfectly flat; and over this trap we have a deposit of soft white tufa. We find this tufa deposited in considerable quantities in ancient fountains and wherever ancient streams have flowed. If the mound was formed of any other substance, say the detritus of the trap, then we might conclude that the bones had been excavated out of the banks of the river and deposited there. But the bones are found in the tufa deposited by the water, and as the tufa came from the water I imagine the bones came from the water after having floated down.

MR. W. J. HAMILTON.—I think from the explanation of Dr. Livingstone, it would appear that the bones are of a much more ancient formation than his first description of them would have led us to suppose. His first impression was that they were washed by the waters into the eddy, whereas by his present account it appears that they were pre-existing, and were merely washed out or exposed by the action of the water.

DR. LIVINGSTONE.—I imagine the tufa was deposited in the eddy of the waters, and these bones, floating down, were deposited in the tufa; then the weather wore away the tufa and exposed the bones. Some of the bones had fallen down to the bottom of the mound. But all would be cleared up if some geologists would go there and examine the mound.

THE PRESIDENT.—I beg to say that I completely understand the nature of the question put by Mr. Hamilton, and of the answer of Dr. Livingstone. I have not conversed with my friend respecting the structure of the interior of Africa without being completely cognisant of what he meant. If I understand him aright, there was a period when a large region of the interior was occupied by waters that have now been let off. The animals which inhabited the banks of the broader and deeper waters at that period have perished, and their bones have been deposited in this tufa. That tufa being desiccated, bones have been found in it.

DR. LIVINGSTONE.—The bones are found in a mound.

THE PRESIDENT.—Very well: the bones are found in a mound which has been formed out of these tufaceous deposits. I perfectly understand Dr. Livingstone, who has given a very fair and rational explanation of the whole

phenomenon. I am glad Mr. Hamilton asked the question, in order that we should completely understand the case.

The PRESIDENT, in calling attention to the next subject on the paper, "The Preparations for the Departure of the Livingstone Expedition," reminded the Society that this was probably the last occasion they would have of meeting the distinguished traveller in that room. He then read the following Letter agreed to by the Council of the Society : *

To the Earl of Shelburne, Under Secretary of State for Foreign Affairs.

15, Whitehall Place, 13th January, 1858.

MY LORD,—In reply to your letter of the 19th December last, in which, by the desire of Lord Clarendon, you ask the Council of the Royal Geographical Society to furnish his Lordship with any suggestions they may have to make in respect to the scientific portion of the labours of the expedition of Dr. Livingstone, I beg to offer the following statement.

At the last Meeting of the Council, held on Monday last, your Lordship's letter was read, and Dr. Livingstone was then called upon to explain his own views and wishes. Thereon he informed us as to the proposal which he had sent in to Lord Clarendon, after consultation with those men of science on whom he could best depend.

Having duly considered the subject, the Council passed the following Resolutions unanimously :—

1. The Council of the Royal Geographical Society having received from Dr. Livingstone an account of the proposal made by him to the Earl of Clarendon in reference to the expedition up the Zambesi river, beg to express their entire approbation of the project and of the persons recommended to be the scientific companions of the leader—these persons being Commander N. B. Bedingfeld, F.R.G.S., Dr. J. Kirk, F.R.G.S., as naturalist, Mr. R. Thornton as mining geologist, Mr. Thos. Baines, F.R.G.S., as artist, draughtsman, and storekeeper, and the Rev. C. Livingstone as general assistant.

2. The Council engage to furnish Dr. Livingstone with various suggestions concerning the observations to be made, and the best method of registering them.

3. That considering the well-known unhealthiness of the delta of the Zambesi below Tete, the Council earnestly recommend to Her Majesty's Government that Dr. Livingstone and his associates be forwarded (if practicable) from the mouth of the river to Tete in a *decked* steam vessel of light draught with as much celerity as possible, and that the steam-launch in preparation be employed solely for the navigation of the stream above Tete.

I have the honour to be,

My Lord,

Your Lordship's obedient servant,

(Signed)

ROD. I. MURCHISON,

President Royal Geographical Society.

DR. LIVINGSTONE.—When I left the Makololo to go to Loando, I was in very much the same position that I find myself in now. I had been talking a great deal about the white man's country and about our ways to the Makololo, and a party of twenty-seven accompanied me to the west coast. When they came back, I said to my friends the Makololo, "Here are your own countrymen; let them speak; I intend to be silent now." I go out this time with several scientific gentlemen, and I hope, if it please God to spare us to return, to be

* See Proceedings, No. II., vol. ii., p. 82.—Ed.

able to say when we come back, "I will be silent; let them speak." I expect that Captain Bedingfeld will be able to give a good account of the river system of the country. We are not at all certain as to that wonderful net-work of waters to the northward of the parts that I traversed. That will be one point which we shall endeavour to ascertain. I have the greatest confidence that Captain Bedingfeld will give us accurate information on this point, and also as to the navigability of the Zambesi itself. I came down that river when it was full. I have no authority for what it may be at low-water. I take the authority of two or three naval officers who ascended seventy miles when it was at its lowest—sixteen feet below what I saw it at—and their opinion was favourable as to its navigability, and I hope Captain Bedingfeld's judgment will also be favourable. Then, Dr. Kirk is an economic botanist; he is expected to give us a full account of the vegetable resources of the country. From Mr. Thornton, of the School of Mines, we expect to get a full account of the mineral resources of the country, especially in relation to the coal-field, specimens of which I brought home with me. Then, we are accompanied by an artist, Mr. Baines, and my brother will also attend to photography, so that we hope to give you all an opportunity of seeing exactly what the sun tells upon collodion. Dr. Kirk being also a medical man, will be able to determine the value of my opinion respecting the healthiness of the high lands over which I passed, and their suitableness as a residence for Europeans. I would like you all to remember that the Zambesi is about the dividing point between the fertile country northwards, and the comparatively arid country to the south. In the north, and especially to the west, cotton abounds in large quantities. Fortunately, to-day, in packing up, I stumbled upon a piece of cotton which I carried all the way from Angola. In speaking to a gentleman at Manchester, I mentioned that this cotton was very short in the staple, about half an inch in length; but I find upon inspection that it is double that length, and is a valuable cotton. That cotton grows in Angola, and I believe the country to the north of the Zambesi is to a large extent admirably adapted to the cultivation of cotton. And, no doubt, there are many other products in that fertile country. I would also say with our Scotch poet Burns:—

"The best laid schemes o' mice, an' men,
Gang aft-a-gey."

There may be some little hitch; we may meet with some misfortune, with something we do not expect. But we mean to do our best, and we are determined to do our duty. And I would most gratefully thank the Geographical Society and its officers, and you, Mr. President, in particular, for all the kindness and all the honours that have been heaped upon me. I thank you most heartily, and I hope that I and my companions may be the means of introducing a new state of things into that hitherto down trodden country.

The PRESIDENT finally informed the Meeting that it had been resolved to give Dr. Livingstone a farewell public dinner on his departure on the 13th inst., and concluded by expressing the hope that many of his friends and admirers would attend.

Seventh Meeting, Monday, February 22nd, 1858.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS.—*Mr. T. W. Hinchliff and Mr. George Seymour were presented upon their election.*

ELECTIONS.—*Lieut. C. C. Gordon, R.E.; Capt. G. Hancock, R.N.; Sir*

Samuel M. Peto, Bart.; Edward Beldam; N. Bridges; J. H. and W. J. Browne; A. C. Gregory (late Commander North Australian Expedition); Wm. Gaussen; John Kirk, M.D.; and P. L. Simmonds, Esqrs. were elected Fellows.

AUDITORS.—*Thomas H. Brooking and E. Osborne Smith, Esqrs., on the part of the Council, and Thomas Lee and W. Foster White, Esqrs., on the part of the Society, were appointed Auditors.*

EXHIBITIONS.—*A bust, by Mr. Wyon, and photographs of Dr. Livingstone, by Claudet and Clarkington; instruments, by Casella, for the Livingstone Expedition, presented by the Society; and a Chinese Map of the World, presented by Mr. Lockhart, were exhibited at the meeting.*

The first Paper read was—

1. *On the Arru Islands.* By ALFRED R. WALLACE, F.R.G.S.

DURING a six months' residence in these islands (January to June, 1857) my movements were very limited, owing to a visit of the Magindanao pirates, who devastated some of the northern islands and the eastern coast, and struck such terror into the natives, that they could scarcely be induced to leave their homes. I, however, succeeded in reaching the eastern side of the main island by one of the curious channels which traverse it, and which I was most anxious to examine myself, as from the accounts of the traders I could make out nothing of their real nature. This journey, with some other excursions into the interior, has enabled me to understand the accounts I have received of the remaining portion, and obtain a general idea of the geography of this interesting group. The position of Dobbo, the Bugis trading village, has been determined by Captain Stanley, and the northern and southern limits are pretty well known by the observations of the Dutch and French exploring vessels; my remarks will, therefore, be principally confined to the physical features of the islands, which are in many respects highly interesting.

The Arru group may be said to consist of one very large central island with a number of smaller ones scattered around it. The great island is called by the natives and traders "Tanna busar" (great or main land), to distinguish it as a whole from any of the detached islands. It is of an irregular, oblong form, about 80 miles from north to south, and 50 from east to west, in which direction it is traversed by three channels or rivers dividing it into four portions. The northernmost of these, the river Watelai, I passed through, and found the entrance about 25 miles S.S.E. from Dobbo, in the southern angle of an extensive bay. The entrance is about a quarter of a mile wide, with low undulating land on each

side. It gradually narrows to about the eighth of a mile, which width it retains, with very little variation, till on approaching its eastern mouth it again spreads out to about one-third of a mile. Its course is winding moderately, with a general direction of E.N.E., the extreme range of the bearings in passing through it being 105° . The banks (except near the eastern extremity, where there is much tidal swamp) are dry and moderately elevated. In many parts there are cliffs of hard rock, more or less worn away by the action of the water. A few smaller streams enter it right and left, at the mouths of which are some small rocky islands, and on the whole it has every feature of a true river. It is, in fact, difficult to believe you are in a small island, and not on a fine river watering some extensive country. But that the clear, cool water around you is briny as the ocean there is nothing to undeceive you. The depth of this stream is pretty regular, being from 10 to 15 fathoms. Its length is, according to the best estimate I could make, about 44 miles. The other two rivers, whose names are Vorkai and Maykor, are stated to be very similar in general character. Between these two, however, which are near together, the country is flat and swampy, and there are innumerable cross channels cutting the land up in every direction. On the south side of Maykor the banks are very rocky, and from thence to the extreme southern end of Arru, near the small island of Kri, is an uninterrupted extent of rather elevated and very rocky country, penetrated by numerous small streams in the high limestone cliffs, bordering which the larger portion of the edible birds' nests are obtained. The two southern rivers are universally declared to be longer than Watelai.

The whole country of Arru is very low, but by no means so flat and swampy as has been represented, or as it appears from the sea. By far the greater part of it is dry rocky ground more or less undulating, now rising in abrupt hillocks, now cut into steep and narrow ravines. Except the actual tidal swamps, which extend on one side or the other at the mouths of most of the small rivers which everywhere penetrate it, there is no level ground, although the greatest elevation is probably not more than 200 feet. The rock, which everywhere appears in the ravines and brooks, is a coralline limestone, in some places soft and friable, in others so hard and crystalline, as to resemble the mountain limestone of England. The small islands which surround the central mass are very numerous, several hundreds in number. On the west are very few, Wamma and Pulo Babi being the chief. On the north-west extremity of the main land of Wokan is Ougia, and a little beyond it, Wassia, the north-westernmost of the group. To the east of these, and all along

the east coast, are an immense number, extending to the extreme south, but nowhere reaching more than 15 or 20 miles from the central island. All are contained in a very shallow sea full of coral, and producing the pearl shells, which form the principal article of commerce in the islands. The whole of the islands are covered with a dense and very lofty forest.

The physical features here described are of the greatest interest, and probably altogether unique, for I have been unable to call to mind any other islands in the world which are completely divided by salt-water channels, having the dimensions and every other character of true rivers. What is the real nature of these, and how they have originated, are questions which have occupied much of my attention, and which I have at length succeeded in answering, to my own satisfaction at least. There are three distinct modes by which islands may have been formed, or have arrived at their present condition,—elevation, subsidence, and separation from a continent or larger island. Most volcanic islands have been elevated; coral islands with lagoons or with barrier reefs have suffered subsidence; while our own islands, Sicily, Ceylon, and many others, have no doubt been separated from the adjacent continents. Now, the Arru islands, being all coral rock, and the adjacent sea all shallow and full of coral, it would seem easy to account for their origin by supposing them to have been elevated gradually from beneath the water, as the much more lofty islands of Ké, sixty miles to the westward, have no doubt been. But in this case it is impossible to explain the formation of those regular river-like channels which cut across the largest and most elevated mass. A fissure produced during elevation will not explain it, for it has all the regular curves and windings of a river; and the action of tides and currents combining with the elevating force will, indeed, well explain the origin of separate islands divided by channels, of varying width and depth, but cannot be imagined to have produced a true river-bed 40 miles in length and of the greatest regularity both in width and depth. If we suppose the subsidence of a more extensive island to have brought Arru to its present form, we shall find it equally difficult to account for these rivers, because the subsidence of any country with an irregular and undulating surface must, by allowing the sea to overflow all the level tracts, produce a most irregular distribution of water in the channels separating islands, and form deep inlets, creeks, and inland lochs, all of which are here absent. The only other way of accounting for the origin of the Arru Islands is, by supposing them to have once formed a part of the main land of New Guinea, from which they have been separated

by the subsidence of an intervening district. The principal objection to this view is the great width of open sea (from 100 to 200 miles) between their eastern limits and the south-west coast of New Guinea. It is, however, to be observed, that this sea nowhere exceeds a depth of 40 fathoms, while immediately to the north, a fathomless sea reaches close up to the New Guinea coast, and also within 20 miles of Arru on the west. By supposing the central land of Arru to have remained unmoved during the subsidence, the present transverse channels may be explained as being in fact portions of actual rivers which flowed from the great central mountain-range of New Guinea, and here had their outlet after a course of two or three hundred miles. The position and direction of the Utanata and Wakua rivers in New Guinea, renders it not improbable that the Arru rivers may have been once the continuation of them. In no other manner does it seem to me possible to explain the origin of these channels; for I believe no example exists of anything but true rivers producing narrow, winding channels of regular width and depth *through an undulating rocky country*. If, therefore, there is only one cause in existing nature adequate to produce the effects visible, we must impute them to that cause, even though implying changes of sea and land of such an extensive character.

We have, however, other evidence of a totally distinct nature, which gives a powerful support to this view of the origin of the Arru Islands. The distribution of the animals of Arru and New Guinea proves the close connection between these countries, it being evident that, where a considerable number of animals which have no means of passing from the one to the other are common to two countries, some former communication must have existed between them. A few such cases of community may indeed be explained by the various accidents by which animals may be transported from one country to another; but when the community is more general, there is no such easy way of accounting for it. In the present case birds being almost the only animal productions of New Guinea of which anything is known, the argument must be drawn almost entirely from that class, which, it may be objected, can furnish no certain data, as they have the means of passing from one country to the other. It is, however, well known that birds have their geographical limits as accurately defined as other animals, and that many extensive groups are quite as unable to pass wide tracts of ocean as any quadrupeds can be.

The first fact, then, is, that out of the small number of land birds known from all parts of the coast of New Guinea, or about one hundred, I have myself found thirty-six in Arru. This renders it

highly probable that all the birds of Arru are also found in New Guinea; for, to illustrate by an analogous case, suppose about one hundred species of birds had been collected in various parts of Europe, and a person were then to collect for six months in England, it is not likely that more than thirty birds would be common to the two collections, although every English bird is also found on the continent. Some of these birds, however, are incapable of flight, as the cassowary, closely allied to the emeu of Australia; others are short-winged ground feeders, as the beautiful ground thrushes (*Pitta*), two species of which are identical with the only two known from New Guinea; others, again, as the "great bird of paradise" and the "king bird of paradise," are found only in New Guinea and Arru, and not in the islands of Ké and Goram, which actually approach considerably nearer to New Guinea than does any part of Arru. These facts, scanty as they must necessarily be in the present imperfect state of our knowledge of the zoology of New Guinea, certainly support the view I have taken of the former connection of the Arru Islands with that country.

A few remarks on the inhabitants and on the trade of Arru will now be given. The natives are all of the Papuan race, having typically a nearly black skin and woolly or frizzly hair. They are taller than the Malays, and more slenderly made; have a flatter forehead, more projecting brows, larger and thicker nose, with the apex rather bent down, and thick lips. The varieties, however, are so numerous and puzzling, that a person unacquainted with their origin would be apt to conclude that no line of demarcation could be drawn between the Papuan and Malay races. In Arru there are evident signs of the admixture of Malay, Arab, and European blood, and that so extensively and for so long a period, that the mixed races perhaps preponderate over the pure Papuans. Everywhere are found natives of Macassar, Javanese, Ceramese, and Amboynese, who have native wives, and have settled permanently in the country. In the Mohammedan districts a lighter skin, and finer features, indicate the infusion of Arab blood, while the discovery of many Portuguese words still in use in Arru, though unknown to the Malays, enables me to account for some decided South European characteristics which I had previously observed. That enterprising nation had evidently discovered these remote islands, and commenced the trade with them during the short period they held the supreme dominion of the Eastern seas.

The languages spoken in Arru are very numerous, but they possess so much in common that the different tribes can make themselves understood without much trouble. The affinities of the lan-

guages of this part of the Archipelago are very obscure, owing to the difficulty of distinguishing between the words introduced by the constant trading intercourse and intermixture, and those resemblances which arise from a community of origin. More materials must be collected to come to any definite conclusion on this point.

The character of the natives of Arru is very different from that of the Malay races. They are less reserved and apathetic, they speak louder, laugh more, and are altogether a much noisier, merrier set of people. The difference is, in fact, so very marked and striking, that it alone would suffice to separate them completely from the Malays. They wear no clothing, but a small waist-cloth for the men, and a piece of matting for the women. The bow is their national weapon, and they are very skilful in the use of it. They cultivate yams, sweet potatoes, and other roots, which with native sago form their whole food, the coast tribes adding fish, and those inland the flesh of the wild pig, kangaroo, cassowary, and various birds which they obtain occasionally with their bows and arrows. A rich layer of vegetable mould over the coral rock produces sugar-cane of the finest quality, which they chew incessantly and sell during the trading season at Dobbo.

In the villages of Wamma, Wokan, and Maykor, are resident schoolmasters, sent by the Dutch Government from Amboyna, and the inhabitants are Christians; one or two other villages are Mahomedan, but all the rest of the population are pagans. As far as I could judge, however, there is very little difference in their degree of civilisation, that seeming to depend more on their proximity to Dobbo, and the amount of communication they have with the traders. A Dutch war-schooner brings a commissioner annually to Arru, who stays about a month visiting all the principal villages to hear and decide disputes among the natives, and with the traders; so that the whole group is actually under the Dutch Government.

The trade of Arru is very considerable, and is all carried on with the port of Macassar and with the islands of Goram and Ceram. In the present year (1857) fourteen large prows, of from fifty to one hundred tons, and one brig arrived at Dobbo from Macassar. The owners are Bugis, Chinese, or Dutch, and the gross value of their cargoes about 20,000*l*. Besides these, not much short of two hundred boats and prows of small size arrived from Ké, Goram, and Ceram, the whole value of whose cargoes may be 7000*l*. or 8000*l*. more. The Macassar traders bring rice, tobacco, gambir, muskets, brass cannon, gunpowder, gongs, swords, knives, choppers, axes, English and Chinese crockery, calicoes and cottons, Bugis cloth and arrack. The prows from Goram and Ceram bring principally sago-

cakes, which are there manufactured for the supply of all the eastern part of the archipelago. The Ké islanders bring boats and prows for sale, wooden bowls, native earthen vessels, cocoa-nuts, and plantains. The produce obtained consists of pearl-shell, pearls, tripang, tortoiseshell, edible birds'-nests, and birds of paradise. Of these, the tripang, birds'-nests, and I believe most of the pearls and tortoiseshell find their way to China, the mother-of-pearl shell principally to Europe.

Each of the larger prows calls at Ké on its way to Arru, and purchases there one or two small vessels, which are loaded immediately on arriving, and sent with a supercargo to pick up produce among the islands on the east coast. The traders themselves reside at Dobbo, where they all have houses built entirely of poles and palm-thatch, and annually repaired. Natives from all the adjacent parts daily arrive, bringing their little bits of produce, which they sell to the highest bidder. They may often be seen wandering about with a single pearl-shell, calling at every house to see where they can get the highest price. These, as well as the tripang, tortoiseshell, and birds'-nests, are all bought by weight; and a whole cargo is made up by purchases of a few pounds or even a few ounces at a time. When a native has accumulated a little stock of produce, he takes payment in an assortment of articles, including always a box of arrack, the quantity of which consumed is immense. About 3000 boxes are brought annually, each containing fifteen square bottles of very near half a gallon each, making a total of about 20,000 gallons of strong spirit.

The prows begin to arrive at Dobbo in December, at the commencement of the west monsoon; and in June and July they return to Macassar. Some of the small traders remain the year round, picking up produce at a greater profit when there is less competition; and some of the larger merchants leave agents to do the same for them. Some years ago the profits of the Arru trade were very great; now they are very moderate, owing to the excessive competition. English calicoes can be bought in Arru as cheap as they can in England.

With the exception of the short visit of the commissioner, there is no law or government in Arru; yet the motley population, all striving to get what they can, live very peaceably together. Every one minds his own business, and, although he "does that which is right in his own eyes," takes care not to injure his neighbour. Gambling quarrels occasionally arise among the Bugis, and a few deaths by the creese may occur, as they do in Macassar; but on the whole, considering the mixture of races and religions, the competi-

tion in trade, and the crowding together of a population of about a thousand in such a remote spot and so far removed from the civilised world, a degree of good feeling and charity is shown which I am very much afraid would not exist in an equally miscellaneous assemblage of Europeans for similar purposes.

A few remarks on the climate will close this short notice of the Arru Islands. In most districts where the monsoon winds prevail, they regulate with more or less exactness the wet and dry seasons. In the south-western half of the archipelago, as far as Timor, Macassar, and N. W. Borneo, the east monsoon is accompanied by dry weather, the west by almost continual rains. In N. E. Borneo (Labuan), however, the seasons are reversed; the west monsoon, from about October or November to March or April, being accompanied by dry weather, and this same rule prevails more or less over all the islands of the Molucca Sea. In Arru I was led to expect the same kind of seasons, and was therefore much surprised on arriving there in January, which should have been the height of the dry weather, to experience during the whole month violent storms and almost daily rain. In February and the beginning of March it was finer, but still not a dry season, there being only periods of four or five fine hot days alternately with an equal quantity of wet, windy, and cloudy weather. The end of March and all the month of April were very fine. In April the winds began to be variable, and in May, when the east monsoon had regularly set in, the weather became wet and gusty, as in January, and this continued till we left in June. Both the natives and the traders assured me that the only regular dry season in Arru was a short one in October and November, during which months there is often no rain at all. This is just at the time of change from the east to the west monsoon, and from the dry to the wet season in the south-west parts of the Archipelago. This is only one of many anomalies in the climate of the various islands, an explanation of which cannot be given without more numerous and more accurate observations than have yet been made.

MR. J. CRAWFURD, F.R.G.S., said he had never visited the islands, but he had written about them. The name was a matter of curiosity: it had no relation whatever to our word "arrow" or dart, but signified in the Malayan language the tree *Casuarina muricata*. The native inhabitants were a peculiar people. Mr. Wallace concluded they were negroes, similar to the negroes of New Guinea; but he had seen them as more nearly resembling the inhabitants of the north of Australia. The population of the islands was very small, about 80,000, giving about eight to the square mile. A bank ran along between the islands and New Guinea. Tortoise-shell, mother-of-pearl, pearls in small quantities, edible birds'-nests, and birds of paradise, constituted the chief wealth of the islands. The birds'-nests were found in caves towards the

eastern side of the island; and the fishery of the tripang, the tortoise-shell, mother-of-pearl shells, and pearls on an extensive bank to the east. He had looked into the returns of what we received into this country of tortoise-shell and mother-of-pearl, and was surprised at the quantity consumed here: 33,550 lbs. of the former, value 33,153*l.*, and above 100 tons of the latter, value 34,630*l.*, had been imported into England. The islands were covered with stupendous forests; but then it ought not to be forgotten the most bulky trees will grow on the smallest amount of soil, where nothing like food for man can be produced—as, for example, the firs of Norway. The proof of fertility is the production of grasses in abundance and of good quality. The production of huge forest trees, be the trees ever so large, is not of the slightest consequence as indications of fertility. Travellers ought to be aware of this.

The second Paper read was:—

2. *Note on Sabrina Land, &c.* By CHARLES ENDERBY, Esq., F.R.G.S.

WITHOUT wishing to detract in the smallest degree from the merit due to Admiral d'Urville, Commodore Wilkes, or the officers and crews of the French and American Exploring Expeditions, for their discoveries in the Antarctic Ocean in the year 1840, I think it due to the memory of Captain Balleny that the discoveries he made in 1839 should be more determinately fixed on our charts than at present.

With this object I consider it my duty to bring under the immediate notice of the Council of the Royal Geographical Society the subject of South Polar Discoveries; and therefore beg, in the joint names of my brothers and self, to present the Journal of one of your gold medallists, Captain Biscoe, when in the command of the "Tula" and "Lively" from the year 1830 to 1833, on the occasion of his having discovered Enderby and Graham Lands. This Journal was kept in duplicate, and the other part has been deposited in the British Museum.

I also beg, in the joint names of Mr. G. F. Young, Mr. Thomas Sturge, Mr. Henry Buckle, my brothers, and self, to present to the Society the Journal and Log-book of the voyages of the "Eliza Scott" and "Sabrina," under the command of Captain Balleny, in the years 1838 and 1839, when he discovered the Balleny Islands and Sabrina Land; and it is to the last mentioned discovery, Sabrina Land, that I am desirous of drawing your special attention. This land, as will be seen on reference to the South Polar Chart published by the Admiralty, is stated to be doubtful; and in the Journal of the American Exploring Expedition it will be observed that this same

* See the ninth Volume of the Society's Journal.—ED.

land was sighted and marked in the American charts as Tatton North's High Lands.

I submit for the consideration of the Council of the Society whether the discovery mentioned should not be more clearly marked on our charts, otherwise a question may at some future period arise as to the discoverer of the Southern Continent, since it has not yet been ascertained that Enderby Land is attached to that beforementioned, and in such case the Balleny Islands would not afford a claim of the nature of that set up.

In presenting these Journals to the Society, the gentlemen with whom I was associated in the equipment of the expedition fully concur with me in opinion that they should be deposited with your Society, where they will be in safe custody and properly appreciated, and where reference can be made to them if requisite.

I take this opportunity to state that I transmitted to the late Colonel Colquhoun, a member of your Council, an extract from the log-book of the ship "Brisk," belonging to the Southern Whale Fishery Company, which vessel I equipped, under the command of Captain Tapsell, from the Auckland Islands to the Antarctic Seas, in February 1850; and as I have neither seen nor heard that any notice has been taken of this voyage, I fear the paper has not come to hand.

Captain Tapsell was absent about six weeks, sighted the Balleny Islands, and proceeded thence to the westward to the long. 143° in a considerably higher latitude than that followed by Commodore Wilkes, without his having sighted land. As, however, I have not the Journal to refer to, I am unable to state if the weather was such as to enable him to see to any distance, but to the best of my recollection he was not impeded in his voyage by fogs.

If the Society should deem the subject of importance, I feel sure that on application to Mr. J. D. Powles, Chairman of the Southern Whale Fishery Company, by Mr. T. H. Brooking, a member of your Council, an inspection of the Journal would be readily permitted.

The above, together with the Journal of the "Eliza Scott," having been referred to Rear-Admiral Sir George Back, as one of the Vice-Presidents, Sir George says, that "having examined Mr. Balleny's Journal, I can come to no other conclusion than that he is entitled to the discovery of the islands which bear his name, including Sabrina Land, and that it would be an injustice to the memory and labours of that adventurous seaman to deprive him of the honour."—Ed.

Eighth Meeting, Monday, March 8th, 1858.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS.—*Lord Keane and Captain Sidney Webb, Mr. T. W. Atkinson and Mr. Nathaniel Bridges, were presented upon their election.*

ELECTIONS.—*Sir Culling E. Eardley, Bart.; the Rev. J. W. Hammond; the Rev. G. R. Lowden; Lord Radstock; Captain John Walker, Her Majesty's 61st Foot; Dr. G. Webster; and George Arbuthnot; Augustus F. and John W. Birch; W. Fowell Buxton; Hugh C. E. Childers; Charles H. Dickson (Her Majesty's Consul at Sukumkalé); William Lockhart (of China); William Longman; J. W. Towson; Alexander Trotter; Arthur Vardon; and Robert F. Williams, Esqrs., were elected Fellows.*

EXHIBITIONS.—A number of Inscriptions, copied by Mr. Cyril Graham, and a Japanese hat from the town of Hakodadi, presented by Lieutenant Gilmore, R.N., F.R.G.S., were exhibited at the Meeting.

ANNOUNCEMENTS.—The Chairman stated that he had received a letter that morning from Dr. Livingstone, from Birkenhead, who was in momentary expectation of starting, thanking all his kind friends who welcomed him at the dinner.

The first Paper read was :—

1. *Explorations in the Desert East of the Haurán, the ancient Land of Bashan.* By CYRIL C. GRAHAM, Esq., F.R.G.S., &c.

THE principal results of the journey described in these papers are :—

1. A visit to a very remarkable region, called es-Safáh, lying at above half a degree east of the northern portion of the mountains of the Haurán, and of which region hitherto only very imperfect accounts had been obtained by Burckhardt, Porter, and others, from information they had got from the Arabs of the desert, to whom alone this region was known. It resembles almost exactly the Lejah.* Like that wonderful region, it forms a complete island of basalt, and its interior is rent in the wildest manner; crevices so wide and deep that no one can venture across them. Indeed, it seems as if the whole had once been a mass of molten matter, and while in that state acted on simultaneously by some internal convulsive force and by some violent external force, and then suffered almost suddenly to cool.

* See Porter, 'Damascus,' vol. ii. p. 240.

Perhaps there are few instances of more curious volcanic regions than the Lejah and the Safáh.

2. The discovery of a vast tract in the Desert, called el-Hárrah, and covered with loose basaltic stones, extending for five days' journey eastward, while the mean breadth would be about two days' journey; forming, in short, a zone or belt in the fine rich plain which extends without intermission from the Haurán to the Euphrates.

3. The discovery of a chain of hills rising out of the region es-Safáh, and extending in a direction nearly north and south—a chain above 30 miles in length, and of which the southernmost peak had been the only portion hitherto known to us, and marked in our latest maps as a solitary hill.

4. The discovery of numerous cities or towns of the very highest antiquity situated on the eastern border of es-Safáh, and at different parts of the stony region el-Hárrah.

5. The still more interesting discovery of inscriptions in some unknown character engraved on the polished surfaces of the basaltic stones of el-Hárrah, and accompanied by figures of animals and other representations.

These were the chief results of the journey described in the first paper.

The second paper gives an account of:—

1. The whole eastern border of the Jebel ed-Drúz, which had not been explored; and among these mountains many ancient towns were found, similar to, though some of them more important than, the towns in the centre of the Haurán.

2. Of a vast number of cities and towns scattered over the Desert south and east of the Haurán, and of such high antiquity that they may probably claim to be the oldest towns now existing; and yet not mere sites, not heaps of ruins, but many of them still in as perfect a state as when the old people of this land dwelt in them—the streets perfect, the houses perfect, the rooms perfect, and the great stone doors still hanging, so that to-morrow a new race might take possession and “occupy” any one of these old places. The mansions are naturally to be had “unfurnished,” but the fixtures are there, and the doors shut easily. The whole region east of the Haurán was unexplored ground. The Haurán itself was first visited by Seetzen in the beginning of the present century. He was followed by Burekhardt, who was anxious to explore the whole eastern side of the chain of mountains Jebel ed-Drúz, which forms the geographical limit of the Haurán. Burekhardt, however, in this was disappointed, owing to the unfriendly reception he met with from

the Druses of the mountains, under whose protection it was alone possible to venture on the border of the Desert. He merely crossed the mountains, and then returned and finished his journey in the centre of the Haurán. Since his time the Haurán has been visited by only a few travellers, the most recent and most enterprising being Mr. Porter, whose excellent book gives the most detailed account we have of the Land of Bashan. This gentleman much wished to visit the eastern side of the mountains, and to follow an ancient road which he saw from the castle of Salkhad (the ancient Salcah), and which he heard extends across the Desert to Basrah on the Tigris. His time, however, would not permit him to go east of Salkhad, but it was his strong conviction that important results would arise from a journey in the eastern desert. It was from Mr. Porter's accounts of what he had seen from Salkhad, and of what he had gathered from the natives, that Mr. Graham was induced to make the hazardous journey into the Desert, for the difficulties and privations of which he was so amply repaid by his discovery of these old towns and strange inscriptions.

It is the firm conviction of the author of these papers that we have, in the Haurán, the ancient Bashan itself, still remaining the cities which already existed when the Israelites conquered Og; and, ancient as these seem, he looks upon the more eastern of towns which he found far out in the Desert as dating from a still older period, and probably the work of the first Hamite emigrants from Shinar. The reasons for this belief are given in detail in the papers. Of the inscriptions nothing has yet been made. Whether they are of the same age as the buildings is difficult to say, but that they are of a very ancient form all philologists will probably agree. The fac-similes, together with a paper on the inscriptions, will be published in the *Journal of the Royal Asiatic Society*. If ever decyphered, we may hope that they will throw light on the history of this remarkable country, of whose early inhabitants we know nothing more than the short accounts we glean from the Pentateuch, but whose works are before us in these old towns, which stand as witnesses to all posterity of the truth of the early Scriptures.

The PRESIDENT.—I am glad that you have already returned your thanks so heartily to Mr. Cyril Graham for this very valuable communication, which has thrown so much light on the comparative geography of a region so interesting to all Christians. I have myself no knowledge of this region, but there are gentlemen present who have, I believe, approached near to it; and with reference to what has been written upon it, I need not remind you that several Englishmen have explored portions of the adjacent country. Mr. Churchill

lived many years amongst these Druses who occupy the northern part of Lebanon, and married a person of that country. Mr. Walpole traversed the country from Syria right across the Arabian Desert, but in a much more northerly direction. No European traveller that I am aware of has explored the region that Mr. Graham has now described to you. He has extended his inquiry farther to the south-east of Damascus than any former traveller. I need not say with what fidelity and truthfulness he has given you a picture of the cities described in the ancient writings. I may add, that independently of that absorbing topic—the reference to Holy Scripture—I feel exceedingly interested in the sketch he has given us both of the topography of the country and of that fine people the Druses. Lord Lindsay, who went down farther southward, to the edge of the region which Mr. Graham has examined, speaks of the Druses as a noble and gentlemanlike race. He writes of them as “noble gentlemen,” and I really think that our excellent traveller has made us attached to these Druses. He has spoken of them as a fine people, as his protectors from the hostile Arabs, and as his best friends. I trust we shall hear more of them through the discussion, and I hope some gentlemen will put some pertinent questions to Mr. Graham with respect to them and the architecture prevailing in that region. I understand on the last occasion the attention of the Society was called to the physical and geological portions of the paper, and that it was supposed that some elevation of the country might have caused the desiccation and produced the desert condition of the present land. I understand from Mr. Graham that such is not his opinion. On the contrary, I learn that the country is still very fertile, and that it is solely owing to the mismanagement of the Turkish government, and to the continual inroads of the Arabs, that this region has become a desert.

MR. W. J. HAMILTON, F.R.G.S., with reference to a few remarks from Sir Henry Rawlinson, stated that he could not agree with Sir Henry Rawlinson that these great changes of elevation were continually going on, or that they came within the historic period. No doubt local changes had occasionally taken place, as in the case of Monte Nuovo and the Gulf of Baia, near Naples; but when great districts had been elevated so gradually as not to produce any convulsion sufficient to overturn buildings, the lapse of time during which this elevatory action was going on would generally be so great as to remove its date far beyond the historic period; and, according to Mr. Graham, the buildings here were in such a condition as to show that no sudden elevation had taken place. There were, no doubt, large districts in Asia Minor, where the elevation of the country had been so gradual that even the stratification of the tertiary formations had not been disturbed: therefore it certainly was within the range of possibility that elevation might have taken place in the district without causing any disturbance or injury to the buildings. But there was no evidence within the historic period that any great change of level had taken place in the district alluded to.

The paper itself was one of great interest, as the district eastward of the Trachonitis had hitherto been very little examined.

MR. CYRIL GRAHAM said, any active volcanic agency must have been long anterior to the building of the cities to all appearance.

DR. KINKEL, F.R.G.S.—With respect to the drawing of the head to which Mr. Graham has called our attention, it is decidedly of Greek or Roman origin. First of all, it seems not to be the head of a female; it is the head of a male deity, which I think is evident from the broad forehead, from the manly features, and more especially from the indication of beard under the nose. This beard is evidently there, for if we follow the line of the cheek we see it is distinctly formed; and if it were a female head it could not be there. Besides, the tracing of the hair shows that this is not an ancient Oriental figure. In the

treatment of the head in ancient Oriental work we find a certain regular outline of the hair; the hair is plain and straight. Now the lock to the left is entirely flowing, and flowing in so graceful a form, though a little exaggerated, that it can only belong to a very late period of time. I would say likewise that the eyebrows have the trace of the male form, and not the female, inasmuch as ancient art draws female eye-brows in the form of a semi-circle. Here, however, there is a straight connexion of two curves, which is more the character of the male head. I would also state that if this is the head of a divinity, and not a portrait, it is probably the head of Apollo, an identification of the Roman God of the Sun with the god worshipped in Palmyra. That it is supposed to be a woman may arise from the appearance of the filet, but there seems to me to be visible on the forehead nothing but a tuft of hair. This head evidently belongs to the period of the amalgamation between the East and the West. We have heard of Roman inscriptions found in Palmyra, and the connexion between Palmyra and the West is evident; and so it is very natural that Palmyra, which had a great deal of Roman civilization within its walls, may have been influenced by it in these matters. Therefore I do not think we can lay this head down as an old work. But the door evidently belongs to the period when the old cities were built.

DR. TRUMAN, F.R.G.S.—I should like to ask Mr. Graham whether he found any metallic fastenings to the door, as I see an indication of something like a bolt or a lock on it; and whether he found any specimens of a perfect arch in those cities?

MR. GRAHAM.—No doubt that mark is the place where an iron bolt once went. In every one of the houses I found the marks of such bars. The iron of course would have been taken away long ago by the Arabs, for those cities have been uninhabited for a considerable period. The hole underneath, which is always there, like our key-hole, was no doubt intended for a lock. There is no trace of any lock having been fastened on: probably it was some apparatus to enable the man from without to open his own door without ringing the bell.

DR. TRUMAN.—Did you find any specimens of an arch?

MR. GRAHAM.—I found many instances of perfect arches. That would be, I am told, an argument against the antiquity which I give to those cities. I did not find the arch in all of them; indeed I found the arch almost only within El Haurán; there I found the arch very frequently in houses which were decidedly built long anterior to the time of the Romans, because they frequently bore a Greek inscription which the owner of the house put over his door. In those houses we found such arches, but it has been suggested to me that they might have been introduced afterwards.

MR. E. HENEAGE, F.R.G.S.—Perhaps Mr. Graham will be kind enough to answer me a question or two with respect to the roofs of these houses. You have described numerous large cities in which there are houses that persons might almost take possession of in the present day. Are there any roofs, and if so in what style of architecture are they? Secondly, in the walls of the Cyclopean or any other period are there any gateways, and of what style are they? You have described one public building—was that the only public building you saw in all those cities, or have you reason to suppose that those cities were destitute of large public buildings, because that would be a most singular fact? Thirdly, with regard to the inscriptions on the stones, you have stated that one of them is something like that on a sarcophagus: now in going over these plains which were strewn with stones over a very large space, was there no appearance of graves or anything that would lead to the supposition that these stones might be the tomb-stones of a large public cemetery?

MR. GRAHAM.—First, with regard to the roofs of the houses: in those houses, like all Eastern houses, the roofs were flat. The construction of the

houses was simply this :—Imagine a square building composed of large blocks of hewn stone, and from the walls numerous blocks of stone, sometimes 18, 20, or 25 feet in length, stretch right across. In the space between these stones, smaller blocks are laid in very tight. In many instances I found these quite perfect; and no doubt the former inhabitants, like the Druses of the present day, when they took possession of a house, thatched over the roof with something and put gravel in between. Next, with regard to the walls of the city—I found many cities with walls. The walls were not very high, and they must have been used more as a place for the people to stand behind as a kind of protection, just as the Turks are fond of doing at the present day, than as walls of a city. But in many cities I found walls, especially in that great city Um el-Jemâl in the desert south of Bosra, higher than and as perfect as the walls of Jerusalem. I found gates sometimes, but not very frequently, in the walls. They were generally blocks of stone 8 or 10 feet high, and swing precisely in the same manner as I have shown you in this door, only there were two doors on the principle of folding doors. The next question was, I think, with regard to the inscriptions.

MR. HENEAGE.—Whether there were any remains of graves or inscriptions to lead you to suppose that it was a public cemetery outside the town?

MR. GRAHAM.—No; the stones where those curious inscriptions were found were loose stones lying in the desert. The whole desert for a space of about 5 days' journey—a camel journey—from west to east, and from $2\frac{1}{2}$ to 3 days' journey from north to south, is covered with loose basaltic stones, polished, and on the surface of those stones in some places I found numbers of inscriptions, such as are now upon the table before me. They are, generally, figures of animals very rudely cut, which I am sure no gentleman will say is a high style of art. The inscriptions themselves cannot be deciphered. At the last meeting Sir H. Rawlinson stated that they were Phœnician inscriptions of the most ancient kind we have ever seen. It seems very presumptuous to disagree with so high an authority as Sir H. Rawlinson, but I do not believe them to be Phœnician. Thinking it might interest you who are here this evening, I have copied a portion of the inscription which was found on the sarcophagus of Esmanazar, King of Sidon. It has lately been deciphered; and although on such a short view you may not be able to pronounce any identity between that inscription and this, it will be interesting to see a portion of the longest inscription we have in the Phœnician language.

DR. WORTHINGTON, F.R.G.S.—May I be allowed to ask a question or two with respect to the head now before us? Surely it cannot be the impression upon any person's mind but that that head is of comparatively modern sculpture. In no respect is there any character about it of the ancient Astarte, Milton's Queen of Heaven. It may be a female head, but I confess I trace nothing of the character of Astarte upon it. I should be glad to know whether Mr. Graham traced among the Druses anything connected with the worship of the calf. That is an interesting question, into which Lord Ellesmere some time since inquired, and Mr. Poole of the British Museum recently deciphered some manuscripts to show that the Druses still worship the calf.

MR. GRAHAM.—With respect to the head, I do not wish to defend its antiquity. It may be very modern indeed, but it does not affect my cities. I found it merely in one of those ancient cities which no doubt was afterwards inhabited by the Romans. Next, to come to the Druses: I cannot say that I ever traced among them any worship of the calf, or, indeed, any other form of worship. All I know of their religion is solely what I have read in that remarkable work which was brought to France early in this century, and translated by M. de Sacy, a great Orientalist, and published in Paris in two volumes. There you find the only information about the religion of the Druses. They won't talk about the subject. The only thing I remarked is a

curious theory they have with regard to China. I may first say that the general feature of their religion is that they believe in one God essentially. They believe the Deity to be incarnate; they believe he has been incarnate several times. They believe that the first and noblest creature of the Deity is a principle they call Universal Intelligence, which has likewise been incarnate; but they never talk of this subject. They believe in the transmigration of souls. They believe that a good Druse will have a reward hereafter, and that the soul of a bad Druse will go into the body of a camel or a dog. But, with regard to rewards, they believe they will go into China. They believe that China is peopled with Druses. Whenever I met them they began to ask me about China very eagerly. I was afraid to inform them that we were at war with China, lest I might suffer from our fighting with the departed spirits of good Druses. They universally told me that they came originally from China, and they seemed to know that China is beyond India. Now the name of China is totally unknown to the Arabs of the desert, and the more peaceable inhabitants of Syria. It is only heard among the educated in great cities; however, Druses not only know its name, but they have a confused notion of where it is situated. They believe they came from China, and that after death they shall assemble again there as in Paradise. With regard to the worship of the calf, I can say nothing, because they never worship nor pray in public like the Mahomedans, and they are especially careful not to talk about religion. But since you ask me about this, I may mention one point in which I take great interest. There is at present a large opening for missionary labour among the Druses. They are bound to us English by particular ties, and at the present moment a missionary or a teacher would be received by them with open arms; he would not only not be molested, but would be treated with the greatest kindness, and schools might be organized which one day might be most valuable as a centre-point, in Haurán especially, for missions to the Moslems and to the people round about. From certain kindnesses and protection they received from Mr. Wood, our late Consul at Damascus, they are deeply indebted to the English, and now is the time for commencing such a work.

DR. PH. BARTH, F.R.G.S.—With regard to the inscriptions, Mr. Graham has called our attention to a Phœnician monument which has lately been found, and he said he thought there was some similarity between the letters of the inscription found by him and the inscriptions on the stones in these remarkable cities. It is very strange that many of those letters are entirely identical with the letters still in use with the Berber tribes of North Africa. The Berber tribes have an alphabet, and many of their letters are identical with the Phœnician letters. I find among these letters of Mr. Graham many forms which are entirely similar with the forms of the Berber alphabet. It only remains a question whether these signs represent the same letters as in the alphabet still in use among the North African tribes? With regard to the existence of Greek inscriptions, I would observe that their existence is alone not sufficient proof of their antiquity, because Greek inscriptions are found throughout the whole of Syria and Asia Minor. It is necessary to look at the shape of the letters to determine the antiquity of the inscriptions. Greek inscriptions were used down to the end of the fifth and sixth century. I do not know whether the inscriptions spoken of are of older date. Perhaps Mr. Graham will give us some information with regard to that point.

MR. GRAHAM.—First, I must state that Dr. Barth misunderstood me in saying that I supposed the inscriptions to be similar to the Phœnician. I said Sir Henry Rawlinson thought so. I do not think they are Phœnician. In comparing them with Phœnician, I can only identify for certain one letter; in both cases it is the round O—that is, supposing mine to be Semitic. But supposing it not to be Semitic, there is not then even that identity. The

form is so unlike the form of any other alphabet that I have yet seen, that I can say nothing on the subject. There are some letters which you might fancy were Greek, and some Aramaic, and some Chaldean. I got one whole inscription which at first I thought was Hebrew; but, on the other hand, some of them are so unlike anything Semitic, that I was forced at first to believe that we had two sets of language. On careful examination, however, I found 85 distinct symbols or marks. I do not say that they all represent different sounds, or rather that they have all different radical values; I think many of them are combined letters—that is, that they represent a combination of letters. I am very much interested in what Dr. Barth has stated with reference to the Berber alphabet. I have not yet had the opportunity of seeing it, but I hope he will do me the favour to show me the inscriptions to which he refers; and I have no doubt, if there are several letters similar in both, that we may be able to trace out something. At present there is no clue whatever to the inscriptions.

MR. CRAWFURD, F.R.G.S.—May I ask Mr. Graham whether this character seems to be written from right to left or from left to right? I have no doubt myself it is an original character. There is nothing very remarkable in supposing that such a character should be found, or that there should be several in the same country. I think in India there are eight or ten distinct alphabets, apparently separate inventions. In those parts of India with which I am best acquainted I counted eight or nine different alphabets. The one in question is extremely rude. But to have made an alphabet at all is a matter of great merit, and none but an ingenious race of men could have done it. No negro race has ever invented an alphabet, and no American race has ever done so. The Semitic race is evidently the most ingenious and energetic race of former ages. They bear a near resemblance in that respect to Europeans. I cannot help thinking that, if placed under more favourable auspices, they would have been a great and conquering people, which they never were, the Arabs excepted. With respect to the climate, my own belief is, that no change whatever has really taken place. The upheaving of the land, if there has been any, would produce no effect as far as the water is concerned. The rising of the land must have arisen from meteorological causes. I would ask Mr. Graham if he has found any remains of tanks or reservoirs for water, extending four or five miles in length, for the purpose of irrigating a vast extent of country? What he has stated with respect to the small reservoirs found in towns would answer only for drinking purposes; they would never be sufficient for the fertilisation of country to furnish food for a dense population such as El Haurán evidently must have contained. How was this population supported? We find in Scripture that sheep and oxen abounded. We know very well that sheep will exist without water for eighteen months at a time, but oxen must have water over and over again in the course of the day, even in a wet climate like our own. My notion is that there must have been extensive reservoirs. There were no rivers, no other means of supplying food for a dense population, except by extensive reservoirs, such as exist in several parts of India, especially in the Carnatic. Before I sit down I should like to ask also whether Mr. Graham saw any representations of the celebrated bulls of Bashan, so often spoken of?

MR. GRAHAM.—There are tanks, and what I should call very large tanks indeed, about the size of the one in the Green Park, Piccadilly; but there are none of the size Mr. Crawford speaks of, four or five miles in length. I never saw any of that size. But with regard to the water, I may mention a curious thing, that what I said with respect to these cities south and east of Haurán is applicable to Haurán in the present day. There are thirty-two or thirty-three towns inhabited by Druses; there is no water except what falls from the clouds, and there are only ten or twelve days' rain in the year.

Yet they collect this water very carefully, cover it over, and it lasts a long time. There are no trees in Haurán, except on the western side of the mountain, where there are springs; but in the plain of Haurán there are no trees and no water. I found no bulls engraved on the stones; but the country where I found the stones is to the east of Haurán a good way. In Haurán itself none of these inscriptions were found. It shows that the people who inhabited the country to the far east must have been a different race from the inhabitants of Bashan. It is only there I found the inscriptions. In the Haurán inscriptions are plentiful indeed; but there are none in these cities in the desert. These cities never seem to have been under Roman rule; they seem to have been deserted long before the cities in the Haurán were. They seem to have been cut off from the others; and, therefore, I can well account for there being no bulls put upon the stones. I found many curious things—a greyhound, a monkey, and an Arab on horseback running a man through; but all on the very lowest scale of art. The inscriptions, I think, are read from left to right, and from right to left.

THE PRESIDENT.—I can only repeat my best thanks to Mr. Cyril Graham for this very remarkable communication. I coincide with him entirely as to the probable cause of the desiccation—at least of the want of water, by the destruction of large forests which formerly existed in that country. I have seen examples of it myself in Russia. The loss of water, the lowering of the great rivers in that country, the desiccation of the lakes, and the actual drying up of lands which were formerly wet and spongy, are entirely owing to the cutting down of vast forests which formerly existed, and which, attracting the clouds, caused the rain to fall. We have no need to refer this desiccation to any geological elevation of the country. That simple cause will alone account for the phenomenon.

Ninth Meeting, Monday, March 22nd, 1858.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS.—*Major W. H. Sitwell, Dr. Geo. Webster, Sir Culling Eardley, H. R. Grellet, William Lockhart, A. Trotter, A. Vardon, and R. F. Williams, Esqrs., were presented upon their election.*

ELECTIONS.—*The Rev. Thomas Marziot, Henry G. Bohn, L. P. Casella, Stephen Cave, Cyril C. Graham, Robert M'Kerrell, James Ewing Matheson, John Henning Nix, and Thomas George Staveley, Esqrs., were elected Fellows.*

The Papers read were—

1. *Contributions to the Knowledge of New Guinea.* By Dr. SALOMON MÜLLER.

Communicated by JOHN YEATS, Esq., F.R.G.S.

THIS was an account of those parts of New Guinea which are least known to Europeans, namely, the south and south-west coasts. It was accompanied by a large map containing the latest observations, soundings of the Princess Marianne Strait, and views of the land in the neighbourhood of Triton Bay, &c.

The physical condition of this region is very varied. From east longitude $132^{\circ} 30'$, or perhaps a little less, to about $135^{\circ} 30'$, there are high cliffs; only within the numerous bays are any levels to be seen, but near the last-named degree the rocks retire from the shore gradually southwards, and in this direction an extensive level border is visible, which stretches away in one vast wilderness to Torres Strait. In lat. $5\frac{1}{2}^{\circ}$, about, there rises a lofty mountain chain, which opens out north, and at $4\frac{1}{2}^{\circ}$ presents an uncommonly bold aspect, some of the summits seeming to be raised above the limits even of perpetual snow; it runs apparently almost east and west, while the smaller chains hemming the coast follow the southeasterly and north-westerly bend of the island. The difference between the two chains is remarkable. That lying far inland has softly swelling outlines and a number of broad flat crowns, extensive plateaux probably, which, judging from their situation, must be surrounded partly by a temperate, partly by a cold climate. The more northerly coast elevations, on the contrary, are almost everywhere rude and craggy in form, not unfrequently resembling tall turrets and fractured battlements. The islands along the coast agree with it in external form and internal constitution; they are separated from it by straits or channels more or less broad, the banks of which are mostly steep as walls, and where damaged by the heavy gulf-stroke are commonly much perforated. Small sandy patches within the bays and coves are peopled by the half-nomadic Papuans. In the straits alluded to, the navigable water is pure and deep, ground being seldom reached at a depth of from 50 to 90 fathoms. Farther south, on the contrary, a ship of moderate dimensions cannot approach within a mile or even two of shore without constant use of the lead.

Some of the numerous river-mouths on the coast must be sought far inland, as in the southern portion of New Guinea the watershed is distant from the west coast. The Princess Marianne Strait is upwards of two geographical miles wide at its northerly entrance, but becomes gradually narrower inland. Its depth, reckoning from low-water level, is from 4 to upwards of 10 fathoms; at the southern outlet only it diminishes to scarcely 2 fathoms. The banks are low and marshy, and covered with wood. Fresh water may be found in a creek that empties itself not far to the south-west of the only little island there is in the strait. From this circumstance, and also from facilities for refitting here, the discovery of the strait is valuable, though it may never become generally useful.

The south-western promontory of New Guinea, as far as $135^{\circ} 30'$ E., is flat, consisting of bluish grey clay, interspersed with pieces

of quartz and limestone. From $135^{\circ} 30'$ to $138^{\circ} 30'$ are slips of white sand mixed with much quartz. According to Professor von Leonhard of Heidelberg, the mountains consist of a Jurassic limestone formation (oolitic series of English geologists), and their higher parts of a very characteristic dolomite of the same age. In the subjacent brownish grey dull-looking limestone fossil shells and vertebræ are found. The bed of the river Timbona yields a deposit not unlike certain strata of the tertiary formation called Tegel, which occurs at Vienna.

In the Princess Marianne Strait, where the banks are elevated beyond the ordinary level of the tide, pisolitic iron occurs (the German Böhnerz, together with Sumpferz or Rasen Eisenstein).

The west coast of New Guinea seems to be everywhere a wilderness, overrun with wood. Reports, botanical, zoological, and ornithological, of the whole district, accompanied, but were curtailed, that time might be devoted to consideration of the climate, the seasons, the tides, and currents, which were more minutely described. Mr. Yeats concluded with a few oral remarks on the inhabitants of New Guinea, their social condition, their usages, and the traffic they maintain with neighbouring people. The island was discovered, he observed, in 1526, but although so near to the Moluccas and to Northern Australia, still remained a comparative blank upon our maps. The Admiralty chart behind him had not the Marianne Strait marked upon it. He submitted that the shores of New Guinea were now known to be accessible, and the population by no means formidable. The Dutch derived from the country, through the Ceramese and others, pearls, gold, spices, medicinal barks, resins, and rare plumage; if our mercantile men were unmindful of these treasures, geographers, he believed, would not be indifferent to the glory of opening up to the whole world one of its largest islands, and to the poor fever-stricken residents of the Papuan coast a health-giving atmosphere among the mountains of the interior. There were fresh laurels for the first pioneers to this elevated region, alluded to by several scientific men, but explored as yet by none.—J. Y.

THE PRESIDENT.—We beg to return thanks to Mr. Yeats for having been so kind as to bring before the public this translation of the memoir of Dr. Frederick Müller. It is quite clear that no geographer present can be acquainted with the vast variety of facts which have been brought before us in all branches of natural history, and I am not overstating the merit of the paper in saying that it is one of the most perfect geographical papers that I have ever heard. Whenever we get near the Indian Archipelago, we are apt to look to Mr. Crawfurd, because he has studied, not only the natural features of the adjoining regions, but also the character and language of the people. With regard to the geology spoken of, I beg to correct the translator in one or

two particulars. He spoke of the Jura chalk : it is what we call in English the oolitic series of limestone. All the southern coasts seem to be occupied by tertiary formations, which, like the tegel of Vienna, are probably younger than our London clay. What the interior may consist of, it will be, as the translator said, an object of great interest for British travellers to determine.

MR. CRAWFORD.—I do not take quite so sanguine a view of the advantages to be gained by a knowledge of New Guinea as Mr. Yeats does. It is the largest island in the world except Borneo, for we are not in the habit of considering Australia an island at all, but a great continent. At the same time, although Providence no doubt had wise objects in view in creating such an island, I believe it to be, as far as we know, the most useless large portion of the globe. From Mr. Yeats's own statement it is covered over with an immense jungle ; it does not contain a single animal useful to man, except a few that have been imported, the hog and the dog. I shall mention a fact interesting to geologists, in comparing it with another island at a short distance. The island that I allude to is Bali ; with an area of only about one-hundred-and-twentieth part of that of New Guinea, it contains a population of 900,000 inhabitants. I would venture to say that the entire country of New Guinea does not contain so many. The inhabitants of New Guinea are in an exceedingly rude state. With respect to its vegetable productions, I am not aware of any of value to commerce except one—the aromatic nutmeg, which it produces in considerable abundance. There are one or two other small articles consumed by the natives of the western part of the Archipelago as a cosmetic. New Guinea is the native country of the birds of paradise, of which there are five or six species. It also produces that magnificent bird the crown pigeon, and it is the only part of the world that does so. The western part of the island has for a long time been subject to a very small island, one of the Spice Islands, now under the protection of the Dutch. The people of the Spice Islands, through the means of a commerce in spices before the arrival of Europeans in India, attained a considerable degree of power and civilization, and they absolutely made a conquest of a very large portion of the western coast of the great island of New Guinea. The President has alluded to some acquaintance I have with the languages in that part of the world. I heard the word "Papua" for example mentioned : that ought to be pronounced "puwa-puwa." It means frizzly or woolly. When the natives of the Indian Archipelago talk of the land of New Guinea, they call it Tanah orāng-punea-punea ; that means the land of the men with woolly heads. With respect to the inhabitants, I believe the country is peopled by the same race of negroes throughout. Being found universally so by the Portuguese, and thinking they bore a strong resemblance to the natives of Guinea, they called the land New Guinea. This people is to be found in our own colonies as slaves. I have seen them in Java and at Singapore as slaves. They are very robust, active men, very little short of the strength of negroes on the Guinea coast of Africa. They are by no means the same as the negroes found in other parts of the East. These last begin at the Andaman, a group of islands in lat. 15° and 16°, in the middle of the Bay of Bengal, where a race of small negroes is found not exceeding 4 feet 8 inches high. I have seen a few of them, but not in the Andamans ; people take care not to land there, for the natives are a mischievous little set. Then, again, we have in the Malay peninsula a very small race ; I will not say, however, the very same that is found in the Andaman Islands. In four of the great islands of the Philippine Archipelago we have them again in considerable numbers. But they are not to be found in the great islands of Java, Borneo, and Sumatra. They are, indeed, very capriciously distributed. We find them next in New Guinea and in all the little islands bordering its western side. From that point they extend continuously

until we come to the Feejee Islands in the South Seas, and then they cease. From the Feejee Islands to the coast of America not a negro to be seen. They are found in the island of New Caledonia, which has lately been taken possession of by the French. The New Hebrides and New Ireland are peopled by them; they are generally robust people, totally unlike the people of the Malay peninsula, the Andaman Islands, and the Philippines. Just one word for a name which has been frequently used by European travellers and referred to by Mr. Yeats. *Alfores* is not the name of a people at all: it is only the corruption of a Portuguese word meaning "outside people." It has nothing to do with any particular race of men. We constantly hear of the *Alfores*; it is equivalent to what the Spaniards call the *Indios bravos*—that is, the untamed, uncivilized Indians. With respect to the Negro languages, I dare say there are about 50 different ones. I have myself examined at least a dozen specimens, and no two of them agree. The only agreement among them is that they frequently borrow words from the Malay language.

MR. YEATS, F.R.G.S.—With regard to the last remark, I would venture to say that there are two names given to these same mountaineers: *Alfores* is the common generic term, but the word *Marassi* is also applied to them. Throughout this paper of Dr. Müller one thing has struck me: his statement is singularly clear, and, where argument is resorted to, it is peculiarly conclusive. He has decidedly stated that there are two distinct races, the mountaineers and the people on the coast. While the people on the coast wander about, a nomadic race, the mountaineers are a settled, energetic, hardy set of men, as we should expect them to be. I have lived in Holland between three and four years, long enough to become naturalised, and I have also lived between three and four years in the mountains at the base of the higher Alps. I know well the distinction between mountaineer and lowlander, and the contrasting qualities of the two races are so clearly brought out in this work of Müller, that I have no doubt in my own mind that there are two distinct races, and that the mountaineers will in the end prove the conquering race.

The second Paper read was—

2. *Latest Communications on Australian Exploration.* By Captain A. H. FREELING, R.E., Surveyor-General, Mr. STEPHEN HACK, and others.

Communicated by the Right Hon. HENRY LABOUCHERE, Colonial Office.

THE communications that have lately been received by the Society relative to South Australia refer to two adjacent regions, the one within the bend of Lake Torrens, and the other lying immediately to the westward of it. As regards the first of these, the results of Eyre's expedition and that of Frome were such as to hold out little or no hope that these regions would ever become available to settlers, yet small watering places have gradually been discovered and cattle stations pushed onward, until in 1856 they had extended up to Mount Serle, and even a short way beyond it, although all knowledge of the country ended at the Mount Hopeless of Mr. Eyre. In August of that year, 1856, a geological expedition was organised, under the joint leadership of Mr. Herschel Babbage and Mr. Bonner,

to explore the Mount Serle district for gold and for coal, and in the course of that exploration Mr. Babbage made a rapid reconnaissance to the northward. After considerable danger and difficulty, owing to the desertion of his native servant and the loss of his horses, he succeeded in reaching and discovering M'Donnell Creek and the large and apparently permanent waters of St. Mary's Pool and Blanche-water, lying on its lower course. Much excitement was caused at Adelaide by the news of this discovery, an account of which was published in the 'Register' newspaper, from which journal it will be sufficient to extract the following remarks, dated November 7, 1856:—

“At a distance of not more than six or eight miles from Eyre's track, over what was presumed to be a parched and thirsty country, Mr. Babbage has been fortunate enough to discover a fine sheet of permanent water, a mile long, surrounded by detached pools of permanent water. These result from a fine creek, having its sources full 60 miles higher up, and watering the country through which it passes. We invite renewed attention to this subject, not only because it is due to Mr. Babbage, but because it shows the impropriety of condemning vast tracts of country where no water was found by some traveller, who years ago struck a path across their solitudes. If large sheets of water, fed by a creek 60 miles long, existed in the immediate vicinity of Eyre's track without being discovered or suspected by that enterprising traveller, the same natural features may now exist in other places, though as yet unseen and unknown by white men. We sincerely hope that Mr. Babbage's discovery may prompt bushmen and others to make occasional excursions into those localities, which perhaps on insufficient evidence have been condemned as unproductive. Many districts are now covered with flocks which years ago were denounced as hopelessly sterile.”

Nothing further appears to have been discovered in these regions until Mr. Goyder's expedition in the following year, 1857, an account of which was read before this Society last November, and which is already published in the Proceedings. It will be recollected that Mr. Goyder was the assistant-surveyor sent to triangulate the country north of Mount Serle, and that, after operations were commenced, he took the opportunity of making a general reconnaissance of the districts in which his duties lay. He descended M'Donnell Creek, and recorded his admiration of the abundance of the water in it, and also at Blanche-water. He followed the creek for 16 miles, and then leaving it travelled $6\frac{1}{2}$ miles to the north-east, and came upon the margin of Lake Torrens. He found the water quite fresh, and an entire absence of marks of higher flood-lines,

and was led to believe that the water was little liable to changes of level. He records the vegetation visible on the northern shores of the lake, and also on several islands in it, whose perpendicular cliffs were clearly discerned by the aid of a telescope. He finally anticipated a time when Lake Torrens should become a *dépôt* for future observers, and a properly constructed ferry-boat placed upon its waters. He, moreover, remarks that it would be perfectly useless to repeat the number of times that he was deceived by mirage and surprised by the enormous refraction peculiar to these plains; that some idea of it may be obtained from the fact that the large gum-trees seen from Weathered Hill to the north proved to be bushes of from two to four feet high, and that a large hill seen from the summit of Mount Serle by the aid of a powerful glass, and which he estimated at 3000 feet, dwindled down to 60.

Consequent upon this report of Mr. Goyder, Captain Freeling, the surveyor-general, set out on an expedition to investigate its truth; he took two boats, and thus states the result:—

“The extensive bays described in Mr. Goyder’s report, the bluff headlands, the several islands between the north and south shores, the vegetation covering them, and their perpendicular cliffs, have all been the result of mirage, and do not in point of fact exist as represented. The conclusion drawn in that report, that the lake is subject only to the most trifling variation of level, is also proved to be an erroneous deduction.”

Captain Freeling arrived at the lake on the 3rd of September. He observed a marked change in the country after leaving Mounts Distance, Gardiner, and Freeling; the ranges merged into hummocky hills, sometimes isolated and standing on an extensive alluvial plain, upon which drift timber was to be seen for miles, and which, by rapidly cracking into fissures under the sun’s heat, gave sufficient evidence that floods took place, that a vast body of water was poured down by the M’Donnell and other streams running northerly after heavy falls of rain, and that the lake, when observed by Mr. Goyder, was merely an accumulation of such flood waters.

Captain Freeling reached the exact spot from which Mr. Goyder saw the lake. He was accompanied by one of Mr. Goyder’s own companions, from whose statement it appeared that the water had already receded half a mile. For six miles back the land was nearly a dead level, and the soil was of the same character as that at the edge of the lake, and it had at times been flooded. The water of the lake was nearly fresh. On walking into it the party sank up to their ankles in mud. The flat-bottomed punt was brought and dragged half a mile across this mud, but there was not even then

enough water to float her. The islands in front certainly seemed to have perpendicular cliffs, but the land just left, and which was a dead level, had exactly the same appearance; the high and distant mountains of the Hopeless range were alone unaffected by the mirage.

The next day a determined endeavour was made by the party to wade through the water and mud, and to reach if possible the opposite shore. The walking was most fatiguing, and actually dangerous, for the mud yielded more deeply as the distance from shore became greater; six inches was the deepest water met with, and that only in patches. Two little islands were visited on the way; they were raised about one foot above the water, and were three miles from the starting point. Some of the party pushed on still farther, almost beyond the limits of their strength, for one of them was barely able to return. The whole party were fully satisfied of the utterly impracticable nature of the water for navigation.

“Neither is there any hope of a more fortunate result being obtained elsewhere; the whole character of the country bordering the lake, which is of the most desolate nature, and at present unfit even for stocking, being the same wherever it is reached.

“Mr. Eyre when visiting the eastern side of the west wing of the lake, Captain Sturt when reaching the same lake on its eastern side, and Captain Frome when reaching it on the western side of the east wing, all agree in their description of Lake Torrens; and their description would apply at this point, were it not for the freshness of the water. Where it differs from their description is here in the freshness of the water. This may be accounted for by the heavy floods in March, and the immense body of fresh water then poured down, still influencing the lake so as to freshen its water; but more probably the water visited by us is not the saltwater lake, although immediately contiguous to it, but the remains of the winter floods retained in a large, slightly hollowed basin, with a clayey bottom, but now rapidly evaporating under the sun’s rays. Were this the case, the same extent of hopeless plains would reach from the neighbourhood of Blanche-water to the lake that has been found on the eastern and western plains.”

No remarks are made in Captain Freeling’s report on the appearance of Blanche-water and the adjacent pools, or on the permanency of their waters.

Mr. Goyder offered his services to explore the district in question more fully, and to ascertain the connection, if any, between the eastern and western wings of Lake Torrens, and to explore a route to the north-west between them; but, on his proposal being submitted to Captain Freeling, it was judged that no doubt existed but that

these two wings were connected, and that the general shape of the lake resembled a horseshoe, and therefore Mr. Goyder's offer was not accepted. This completes the information that has reached us about this region. Its triangulation was expected to have been completed by the end of the season as far as Weathered Hill.

As regards the districts to the west of Lake Torrens, larger tracts have been explored. In May, 1857, an expedition was sent out under Mr. Hack * to explore the north-western interior of the province, starting on a northerly course from Streaky Bay. The stores were conveyed by ship, and the horses landed at Port Lincoln, whence there is a line of numerous watering-places—one in about every ten miles—to Streaky Bay. Major Warburton was occupied at the same time in making an independent exploration. His routes are laid down upon the diagram, and are taken from the maps accompanying Mr. Hack's report, but no narrative of his expedition has yet been received by our Society. During their absence a third party, consisting of Messrs. Thompson, Campbell, and Swinden, made a rapid tour of about 200 miles to the westward of Lake Torrens, and starting from Saltia. Their route does not, however, admit of being laid down with any accuracy; but it is evident that the land they traversed was very far from being a desert, and that they discovered an isthmus of a quarter of a mile in breadth between the southern extremity of Lake Torrens and the head of Spencer's Gulf. †

To recur to Mr. Hack's exploration. After leaving Streaky Bay he encamped at Parla, on the top of a low range commanding an extensive view of the Gawler range, where the expedition is delayed by the illness of one of his most useful servants. He occupies the vacant time by starting with one pack-horse on a reconnaissance, steering for a gap in the range distinctly visible from Parla. On nearing it, he passed through twelve miles of dense scrub, then through a chain of salt lakes difficult to pass, and which was seen from Mount Centre extending to the north-west as far as the eye could reach, while to the north there was a mass of high ranges, one behind another, till they faded away in the distance. On the return journey to Parla, Major Warburton's fresh tracks were crossed; good, permanent limestone wells were found, and the country observed to consist of a considerable extent of fine grassy land running into bold bald downs, intersected with belts and patches of mallee scrub of various extent.

* South Australia, No. 156. Explorations by Mr. S. Hack. Ordered by the House of Assembly to be printed Oct. 13th, 1857.

† Sir George Grey, when Governor, traversed and made a plan of this isthmus.
—Ed.

He again started, but was again delayed by the continued illness of the same servant whom he was obliged to send back to the coast, and finally left Yarwandutta on the 21st of July. At Warroona there is permanent water in a creek; and in every direction, limited only by the scrub to the southward, the view from the hills extends over good grass and salt bush. The salt lakes still continued, but trended farther away from the range. About 25 miles to the north was a large range with a similar line of salt lakes under it. It seemed to be a feature of this country that the drainage of the hills was received by these salt lakes.

Round Toondulya there was grass country in all directions, and a fine permanent spring. Hearing from the black that there was only one more permanent water on this course, at Yarlbinda, he rode there, and found the features of the country to continue the same along the route, and ten miles onward to a detached hill to the north-west, but no other mountains were visible to the north or north-west, and the black guides asserted that there was no water for horses for a very long distance in that direction. Very far off is a country called Naralla, but on this course horses cannot be taken there. As viewed from the highest hill of Yarlbinda, the distant country appeared a level sea of scrub, without a hill or rise of any sort to indicate the existence of water in one place more than another. Mr. Hack felt that he might have gone as far into this scrub as the horses could have lasted without water, and then have returned to Yarlbinda; but such a course would have knocked the horses up, and crippled the future operations of the expedition; and he considered that the letter of his instructions should be departed from, and a practicable route sought out in another direction. The guide recommended that the party should go ten stages to the eastward, to a great salt lake, whence probably an opening would be found to the north. Reports were heard of several permanent waters and good country to the southward, but these were left for future examination, and Mr. Hack adopted the advice of his guide. Shortly after leaving Yarlbinda he passed through second-rate salt-bush country, and then through large alternate tracts of scrub, grass, and again scrub, to Murnea, whence he obtains a fair view of the Great Salt Lake, and again comes upon Major Warburton's tracks. To the north, from the highest hill near, nothing could be seen but a perfect horizon of salt; thence, until arriving at Yardea, the country is of variable goodness, and much of it is bad, but at Yardea itself it is excellent. In country of this description, that is to say, where sometimes there is excellent grass, and sometimes scrub, but with frequent watering-places, many of which

appeared permanent, and all of which are recorded in detail in the report, he travels along the line shown in the map. Freeling Range appeared to be in the middle of good grass country, and a very large spring is reported by the natives to be in its neighbourhood. Grass was found to be growing to the very edge of the Salt Lake. From near Pagan Creek, which promises well as a permanent watering-place, the range begins to break off, and to run out into low hills towards Baxter Range. The horses had become so footsore that it was now a difficult task to examine the country properly, and there was no permanent water found between these last-named places. Mr. Hack spent several days in exploring this part, as he was very anxious to get a good route for stock into the new country he had found; but at present a gap is left of some sixty-five to seventy miles without any known summer water.

He feels assured, from native accounts, of the existence of a very extensive tract of well-watered country to the north, in which herds of wild cattle are reported to exist, but thinks there may be considerable difficulty in finding a good road to it without the assistance of black guides.—F. G.

[The Government of South Australia have taken steps to pursue these discoveries by sending out an expedition, under the command of Mr. Babbage, to explore and survey the whole country between Lakes Gairdner and Torrens. The party is provisioned for eighteen months, and consists of Mr. Babbage as leader, Mr. Surveyor Harris as second in command, with 7 men, 3 drays, 1 tank cart, 16 horses, and 180 sheep. They proceed by steamer to the head of Spencer's Gulf, and will commence their travelling as early as the season will permit them.]

THE PRESIDENT.—We thank the authorities for this communication, and also Mr. Galton for the abstract. Some of the papers have been partially printed by the local Legislature of South Australia, of which this is a very well condensed and perspicuous abstract.

COLONEL GAWLER, F.R.G.S.—I have seen in the Adelaide newspapers summaries of the information Mr. Galton has been so good as to read to us. I have looked over them with very close attention, and have been so deeply impressed with their importance that I have had extracts from them struck off, not knowing the subject would be brought on here, with the intention of laying them on the table. First of all, with regard to Captain Freeling's elucidation or comment on Mr. Goyder's expedition, it seems to me that the good people of Adelaide are right in saying that if Captain Freeling had gone out just after the autumnal rains, when Mr. Goyder was there, and that if Mr. Goyder had gone, as Captain Freeling did, after three months' drought, that each would have seen the very reverse of what they now described. On the very plains of Adelaide, if a stranger were to come there just after the rains, he would have seen, as the early colonists did, a beautiful grassy country, and have been delighted to form a settlement there; but if he were to come after three months' summer heat, he would have said it is a bare brickfield, not worth the trouble of occupying. Such is the character of the land in South

Australia, and such, I take it, is the character of the land which Mr. Goyder and Captain Freeling saw near Lake Torrens. The water in the lake must be acted upon by the same circumstances. After the autumnal rains the fresh water would be abundant, as the fresh water in the Torrens river at Adelaide is abundant; and after three months' drought the lake will be almost dry, the same as the river at Adelaide is. This being the character of the country, I am sure that Captain Freeling's account does not sweep away Mr. Goyder's. The people in Adelaide say, and I think every one who has been in South Australia will say, that you must take the medium between the two. There is good land, but it must be occupied and turned to advantage. That brick-field-looking land at Adelaide, which is so burned up after a drought, is the finest corn country in the world. I doubt not there is profitable land near Lake Torrens, and that there exists some marvellous phenomenon which fills that lake with such an abundance of fresh water, coming down probably by Captain Sturt's enormous watercourse, thirty miles wide.

However, that is not the great point at issue: whether there is to the westward of Lake Torrens a way into the interior—that is the great point with which we have to do. I have always strongly had the impression that there is a way, and this is my great reason for thinking so: When, in Adelaide, the wind went round from the north to the east, the sky became lurid and dry and parched, and those hot winds came of which we have heard so much in Australia. When the wind began to go to the westward of north, it became cloudy and cool and moist. By careful inquiry, I found the same was experienced by the settlers in the Port Lincoln peninsula: they never knew of a hot wind from the north. The people of Adelaide never knew of a hot wind from the north-west; and Mr. Eyre, when he went into the region to the westward of the Port Lincoln peninsula, speaks of the N.E. wind coming from the north of Port Lincoln as never being anything but moist and cloudy (Vol. i. 343; ii. 140 and 143); whereas a little farther to the eastward the wind was always terrifically hot. This wind came from that desert to the east of Lake Torrens, in which Sturt's thermometer blew up—a desert on which, long before he went there, I had put a cross, and said, “A burning desert, the source of the hot winds at Sydney and at Adelaide.” My conclusion having come out so clearly as regards the eastward, I fully expect that with respect to the westward will be equally borne out by the result, and that there will be found—as has recently begun to be found by Mr. Hack, Mr. Swindon, and others, a well-watered country to the westward of Lake Torrens and to the northward of the Port Lincoln peninsula. I think we have sober reason for expecting that that good and well-watered country will be found to be formed by a great drainage coming down from the north and west into Lake Torrens, fed by the evaporation of the Southern Ocean continually blown upon it, and by the tropical rains from the north. I was so anxious that Mr. Eyre should take that direction that I pressed him almost unreasonably to it; but his heart, rendered hopeless by Lake Torrens, was then set on the Swan River, and he took that ever-memorable tremendous journey—a journey which I believe will yet produce great results. I am delighted that the South Australians have taken up the matter in really good earnest. So convinced were they by the reports that came from Mr. Swindon and Mr. Thomson and others, that the run upon the Government Land Office for leases in that direction was so great that the Government got alarmed and stopped issues. They have now begun again, and there can be no doubt at all that there is a large quantity of good land in that direction.

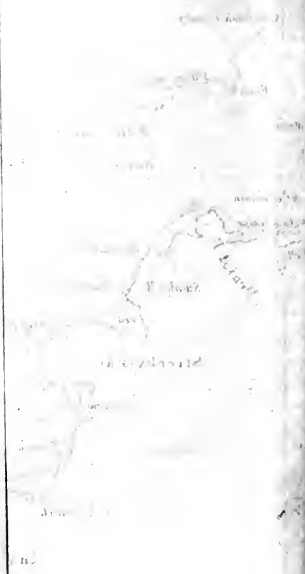
There is another point upon which Mr. Hack speaks steadily, and that is that the natives assert that between Lake Gairdner and Lake Torrens there is a route into the great interior. That is a point likewise of immense importance to us. Any one who will look over Mr. Eyre's travels will perceive that

he came to the same conclusion. His opinion was that the natives came down originally from the north coast in three columns; the first by the west coast, the next by the east coast, and the third down the centre to the westward of Lake Torrens. He believes strongly the country was occupied in that way, and, therefore, that there must be a line of route through the interior.

Now, what a deeply-important political and geographical feature that is to search out! Politically, it brings the rich south-eastern provinces into communication with North Australia, and with the magnificent islands of the Indian Archipelago. By such a route it would be possible to establish electric communication with England, if we chose to lay the line. I do not know whether the Society is aware that an expedition has been formed under Mr. Babbage, and that he has probably already set out for the interior, well prepared with provisions for eighteen months, and with apparatus for distilling water. I consider this expedition of immense importance to all who are interested in the geography of Australia, and that we may at least begin to think about getting up a line of railway from Stokes's Victoria River to the south-western point of Lake Torrens.

The PRESIDENT.—We are much obliged to Colonel Gawler. It is seldom we have persons present so much experienced in Australian geography; and if his view should be borne out, I shall be happy to modify the views which I have ventured to broach theoretically respecting the great interior of that country. I beg to submit to Colonel Gawler that the experience of Mr. Gregory on the north certainly led us to expect that the country towards the interior became so saline that it would be worthless, and useless to try to penetrate it; whilst all our experience upon the west has tended in that direction. Up the Shark river, and to the river that bears my name, the country is so saline that nobody can settle upon it. I am afraid my friend Mr. Arrowsmith's name is not in a better position than my own. His river passes altogether through saline marshes.

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Shelby
William Edward
Exploration
of the
Columbia River
in
1804
and
1805



PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1858.

Tenth Meeting, Monday, April 12th, 1858.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS. — *The Rev. J. W. Hammond, and T. Fowell Buxton, L. P. Casella, and Robert M^rKerrell, Esqrs., were presented upon their election.*

ELECTIONS. — *Dr. Adolphus Bernays; Sir Robert Peel, Bart., M.P.; Dr. John Shea, R.N.; Viscount Strangford; the Right Hon. John Wynne, M.P.; and John Francis Champion; Charles Hutton Gregory, C.E.; Morrell Dorrington Longden; and George William Wheatley, Esqrs.; were elected Fellows.*

The Paper read was:—

On the supposed Discovery of the North Coast of Greenland and an Open Polar Sea; the great "Humboldt Glacier," and other matters relating to the formation of Ice in Greenland, as described in 'Arctic Explorations in the Years 1853-4-5, by ELISHA KENT KANE, U.S.N. Philadelphia, 1856.' By DR. HENRY RINK, M.D., of Copenhagen.

It will be recollected that Dr. Kane attempted to take his ship farther to the northward on the track discovered by Captain Inglefield the preceding year; that he did so, to a short distance; that he was frozen in and lost his ship, and finally saved himself and party by returning in sledges to Uppernavik. During his two years' stay in Smith Sound, he made various sledge excursions; and his discoveries, when engaged in these, must be regarded as the chief profit of the expedition. These discoveries are, 1st, The great Humboldt Glacier, which he describes in most eloquent terms, as the glacial outpouring of that vast ice-field, little less in extent than the whole of Australia, which forms the interior of Greenland; and, 2ndly, The north coast of Greenland and the Polar Sea, which washes its shores, and which is kept open by the Gulf Stream. As to the first point, Dr. Rink denies the existence of any evidence by which we can speculate on the nature of the interior of Greenland; it may consist of mountain chains, which protrude through the ice,

for aught that is known about it. He considers that Humboldt Glacier is but one of the many glaciers which run down into every fiord along the coast, none of which Dr. Kane had had an opportunity of examining, but in the investigation of which Dr. Rink has been actively employed for eight years. He does not even find cause to believe that Humboldt Glacier discharges any large part of the whole amount of ice which moves down from Greenland to the sea, but that the direction of greatest discharge is elsewhere (Jakob Haven, &c.); at all events, data are entirely wanting for estimating either the absolute or the relative amount of discharge of ice from Humboldt Glacier. Dr. Kane describes the formation of icebergs under an hypothesis, apparently offered as his own, of the glaciers moving down along the sea bottom, and from time to time breaking up and floating to the surface. Dr. Rink expresses surprise at Kane's ignorance of his own similar hypothesis, which has been published in many forms, and ought naturally to be familiar to Arctic explorers. As regards the second discovery, that of the northern coast of Greenland and the open Polar Sea, it appears that the entire story rests upon the assertions of Morton the steward, and of Hans, the Greenlander. These two men made a sledge expedition to a distance of three days' journey from camp, but a critical examination into their proceedings during those days leads Dr. Rink to throw great doubt on the value of their observations, as related and mapped out by Dr. Kane. If we are to credit their accuracy, we must be prepared to believe that they laid down more than 20 points of longitude and latitude during their toilsome journey, besides fixing numerous positions on the opposite coast, which Morton maps out in a detailed manner, although he never approached nearer to it than from 25 to 40 miles. Their itinerary is as follows: the first day's journey takes them beyond the face of Humboldt Glacier to open water, flowing with a strong current; the next day's journey is only 6 miles; on the third day they have a very rugged way to travel over, and are detained by hunting, killing, and cooking a bear. A high promontory is before them, which they have not strength to reach; and ultimately they stop at the foot of a "knob," stated by Morton to be 500 feet high, but upon what grounds it does not appear. He ascends this knob, and from its top professes to obtain a view for 36 miles, over a sea entirely free from ice; but we are left entirely in the dark as to the extent of the field of view which is left clear by the promontory. Morton sees a mountain to the northward, which he lays down at the enormous distance of 100 miles from the point where he stood, and yet he remarks on the barrenness of its top and on the streaks

and ledges upon its face. He sees crowds of waterfowl, and Hans observes some plants, but brings back no specimens, although they are named in scientific phraseology in Kane's work. Dr. Rink joins issue on nearly every one of the data and theories based upon Morton's journey. He considers it out of the question that a man, looking out from an elevation of 500 feet, could determine the absence of floating ice at a distance of 36 miles. He also throws great doubt upon the probability of Morton's point of view being as high as he states it to be, for he believes that he identifies it with a hill whose measurement is very variously reckoned by Kane at pages 299, 305, and 307. He argues that the absence of drift ice tends to prove that the sea was permanently frozen to the northward, whence the wind was blowing strongly, and that the vast number of birds go to prove the smallness and not the greatness of the water at which they congregated; and, finally, that there is nothing remarkable in the discovery of a sheet of open water, in midsummer, only 90 miles to northward of where a ship was sailing the preceding year. The picture in Dr. Kane's work of the open sea, with Morton in the foreground, will not (says Dr. Rink) bear criticism. The sun is represented as half bathed in the water, although, at that season of the year and latitude, it must be far above the horizon.

THE PRESIDENT.—In returning thanks to Dr. Rink for this communication, I may remind you that the author is a distinguished Dane, who has spent nine years of his life in studying the natural phenomena of the great continent of Greenland. You have all doubtless admired, as much as I have, the work of that great American explorer, Dr. Kane; and I am sure there is not one present who would not be as sorry as myself to derogate in any degree from his real merit, and from that glory which he really attained for himself by his most adventurous voyage. This is simply a critical essay respecting two points of Kane's voyage, the first touching the formation and movement of glaciers, the other as respects the proceedings of Morton, the steward of Kane's ship; and as I see here present two eminent Polar voyagers, I know they are the persons best qualified to speak on this occasion. In the mean time Mr. Arrowsmith has defined on the map the position which he and others who have gone into the question assume to be the ultimate point which may be relied upon, as having been reached by any one of the persons who served under Dr. Kane.

REAR-ADMIRAL SIR GEORGE BACK, VICE-PRESIDENT.—I think it is the fate of nearly all voyagers and travellers to undergo the ordeal of criticism from other travellers; and, however interesting their accounts may be in other respects, yet, if their observations are not correct, I need not say that they deteriorate in a geographical point of view from the value of their narratives. In making this observation, it will not be supposed for one moment that I cast the most distant reflection upon the memory of that gallant American, Dr. Kane. Nobody could have done better than he did. Few, if any, have undergone greater trials. I would observe that there is not the slightest idea of any concealment in his book. He states clearly the observations which he got from Morton, especially the meridional observations, which are

always most desirable, and which formed one of the bases upon which he founded his map. He added to that, another mode of calculation called the dead-reckoning ; but unhappily, it was an incorrect dead-reckoning, and there was the error. Now if he had done what I am certain Professor Bache or Lieut. Maury would have done—taken the observation of the latitude of the day, and added the difference of latitude of the distance travelled from that point correctly—that difference, added to the latitude, would give the precise point which should be put down for the extreme to which Morton went. That would be the correct latitude. Now, although it may appear to many of us, and particularly to those who are not practical geographers, that a few miles more or less can make no difference in a great and perilous undertaking of this kind—accomplished as it was in such a persevering and gallant manner—yet there is one little national point of view in which it is of some importance. By making this deduction it would then appear that the British flag was unfurled farther north than any other. But, if the correction be omitted, and the error be allowed to remain, then the American flag has an unquestionable claim to the honour. That, I believe, is the chief point. As regards the glaciers, I shall not enter into their theory, because it would occupy too much of our time, and Dr. Rink, who is really an authority upon the subject, has passed eight or nine years of his life in investigating the laws of glaciers. He tells you that, at the elevation of 2000 feet—the level of continual snow—they rise in plateaus one above the other ; twenty-three of which plateaus he counted. That the ice is forced gradually down in one vast mass, following the sinuosities of the valleys to the fiords, and, having a thickness of at least 1000 feet, still glides along the uneven bottom until it is acted upon by the water, and, struggling to rise, is at last liberated by the action of the swell, when vast masses are broken off and detached. Those masses form icebergs, and they are known in many instances to attain a height of from 150 to 200 feet, and even more ; sometimes, indeed, they are fully a mile in length. I think there can be no doubt of that, as Dr. Rink has seen them with his own eyes. A little incident fell under my own observation at Spitzbergen. With my friend Sir John Franklin, and in a boat commanded by the late Admiral Beechey, we were going past a glacier at the distance of perhaps half a mile with a party of men prepared for a survey ; a flight of eider ducks passed by, and one of the officers thoughtlessly fired his gun ; the concussion of this acted on the iceberg and brought down a huge mass. We looked with some interest at it, but without any alarm, for there was a low point of land between us and the iceberg. The mass was submerged for a short time, but soon rose again, and then sent a wave to the opposite shore, perhaps a mile and a half distant. The return of that wave struck the launch in which we were, lifted her up, and threw her high and dry on the beach and upset us. I merely state this to show that there are other reasons besides those mentioned by Dr. Rink, for the appearance of small icebergs, though doubtless he must have seen many similar effects. The learned Doctor says that the ice calved—that it rises from below, which in fact, it generally does, but in this instance such was not the case. Again, Dr. Rink speaks about the open sea in the vicinity of ice : now that is a very delicate question to enter into, and on this occasion I am not prepared to do so ; but I can speak of some of the stream-holes, or open spaces of water, which do occasionally form in the ice. I may mention an almost ludicrous circumstance that occurred when I commanded H.M.S. *Terror*. Surrounded by ice in the frozen straits off Southampton Island, with not a particle of water to be seen, and the ship in some danger, in the course of an hour a pool of water opened out, perhaps some 30 feet in diameter. Within an hour or an hour and a half afterwards, that pool was more or less covered with birds of the gull species, and even large narwhals came up to breathe there. I may mention that it was Sunday afternoon when a sturdy British sailor betook himself to

the side of this open water, and as he said formed a quarter-deck there, and began to think of his wife and children. While he was thus lost in contemplation, a huge walrus rose up within a few feet of him, and so frightened the boatswain, who had never seen one before, that he ran on board and swore he had seen the devil. I only state this as one of many instances to show that wherever there is an open stream-hole, animals and birds invariably flock to it. As to the land which is said to have been seen, I may simply state what you have already heard—that Morton, who was the steward of the ship, seems to have been singularly qualified above all stewards that I ever heard of; inasmuch as he knew how to make observations and other nice calculations, seldom found except in men of superior attainments. Be that as it may, I give him full credit for his knowledge. He says he ascended a hill 500 feet high. Now it is not very difficult to calculate at what distance the land might be seen from that height; but as my friend Captain Collinson has something to tell you on this subject, I leave the explanation to him.

CAPTAIN R. COLLINSON, R.N., F.R.G.S.—I think it very fortunate with yourself, Mr. President, that on this occasion we are acting the part of mediators, and not accusers, and that it has fallen to a Dane, and not to an Englishman, to write this criticism. But I feel assured that we all ever shall acknowledge the debt of gratitude which we owe to the noble individual who made this voyage. It appears to me that we have nearly exhausted all that can be said upon the subject. There are certainly one or two points which require attention. One point which I would advert to is that the existence of the Humboldt Glacier gives a colour to the theory of an open sea, because we never could have a *mer de glace* without great change of temperature. If it were perfectly cold there during the whole season the snow would remain snow as it drifted, but there must be a change of temperature to turn it into ice. I think that is one reason why we may place faith in Morton's account of there being open water. Still I will say this, that as far as my experience goes, it is almost impossible that it could be open water throughout the whole of the year, because I am sure it would have affected the temperature which Dr. Kane experienced at his winter quarters; so that I look upon it as a temporary opening, or water-hole. And I must add that I think Morton is mistaken in his statement with regard to the current. I cannot conceive it possible that a tide should run to and fro at the rate of four knots an hour, the liquid being from 7 to 11 degrees above freezing point, without sweeping the ice out of Peabody Bay and rendering Smith Sound entirely free up to Kennedy Channel. This must only be looked upon as a remark on my part, that possibly Morton may be in error with regard to the current. But there is one other point also I think it right to allude to, for the sake of meteorologists, in which I believe Dr. Kane is mistaken. In his series of observations for temperature he has taken the mean of his thermometers. Now the thermometers supplied to the former expedition were essentially bad. I had not one that registered the freezing point of mercury within 12 degrees. Dr. Kane has taken the mean of these thermometers. In the course of all our observations we corrected each thermometer by the freezing point of mercury, so that in the case of Dr. Kane's temperatures being compared with ours, there is the necessity of a correction. I will now refer to the *veraxa questio*: that is—the extent to which Morton really got. Dr. Kane tells us that these positions are the mean of the uncorrected dead reckonings. As geographers, we cannot accept that; we must stick to observations. What the sun tells us, is more convincing than what we suppose we have gained. By way of elucidating how extremely Morton's reckoning got the better of his judgment, I would just remark that at Cape Maddison he left his sledge and set off for Cape Jefferson. From Cape Maddison to Cape Jefferson is $34\frac{1}{2}$ miles, as the crow flies. From Cape Jefferson to Cape Con-

stitution, his farthest point, is another 27 miles: that makes $61\frac{1}{2}$ miles which he travelled in a straight line; double that (for he came back), and that makes 123 miles; and I think the least we can give him for sinuosities is one-third more, which will make 167 miles. That is to say, he travelled 167 miles in 36 hours; so I believe we are quite justified in having recourse to his observations, and rejecting his reckonings altogether. I believe we shall have to bring Cape Constitution, as far as I can understand, 35 to 45 miles farther south, and the effect of bringing that cape down, will also have the effect of narrowing this channel. I cannot conclude without paying what I think to be a just tribute to the man who commanded on this occasion, and expressing my opinion, how fortunate it is that such a man was there to command, one who could not only persevere in the way he did, but who set himself studiously to work to collect every observation that would bear upon geographical discovery. However we may analyse his theories, or dispute his conclusions, or doubt his geographical positions, yet, as the British nation, we shall never cease to respect with admiration and esteem that noble spirit who went forth at the peril of his life without the tie of kindred or nation to succour our fellow countrymen.

DR. A. ARMSTRONG, R.N., F.R.G.S.—I fully agree with the observations which have been made by Captain Collinson. I beg, however, very briefly to direct the attention of the Society to a circumstance which has not been alluded to in the course of this discussion. It appears to me that nothing new has been advanced by Dr. Kane with regard to the existence of water where he is supposed to have seen it. If we refer as far back as 1827 to Parry's memorable attempt to reach the North Pole, we find that he met with water as high as 82° . It is not improbable that water may have been seen by Dr. Kane's party, but not to an extent that would establish the existence of a Polar sea. If you look to the chart, you will find that the outlet between the eastern coast of Greenland and the western coast of Norway affords greater facilities for the escape of ice than any other part of the Polar Sea. With the prevailing winds you may find the Polar Sea always clear of ice in that part; during the navigable season therefore it is nothing extraordinary to find open water as stated. Off the northern coast of Banks Land, we (in the *Investigator*) saw a space of open water, and we might have supposed, on evidence quite as conclusive, that we saw an open sea extending from that point right to the Pole, had we not been previously aware that Melville Island was in the same meridian. An officer whose observations were generally accurate estimated the extent of water seen at 11 miles, which I think a very close approximation to the truth. Ice was of course beyond it, but owing to the prevalence of the S.W. winds it had been driven off the shore. An observer in that direction would have come to the same conclusion that Dr. Kane did, that the sea extended to the Pole, had he not been aware of the existence of Melville Island. I may also state that in the *Investigator* we found open water extending no less than 90 miles to the northward, off the mouth of the Mackenzie River; but were ultimately arrested by an impenetrable ice pack. Had we therefore not sailed through this space of open water until our progress was arrested by the ice, we might with equal or indeed greater probability have stated our opinion that we had discovered the great Polar Basin. Before I sit down I wish to express the admiration that I have always entertained for the zeal and enthusiasm with which Dr. Kane pursued that voyage. But I must reserve to myself the right to criticise the judgment which he exercised in many respects. I must therefore state my conviction that this much talked of Polar Sea or Basin, as it is sometimes called, has no existence except in the vivid imagination of those who feel disposed to portray it; and I have almost universally remarked that the advocates for its existence are those who are least capable of forming

an opinion on the subject, from never having been in the Polar Sea. From the analogous cases I have mentioned, therefore, and numerous others which may be found in the records of Polar voyaging, we must, I think, arrive at the conclusion that the opinion advanced by the enterprising and lamented Kane is not supported by evidence sufficiently trustworthy or conclusive to establish the fact, and we must consequently ignore the existence of an open Polar Sea in the position indicated.

The PRESIDENT, in concluding the discussion and in complimenting the gallant officers who had spoken on the ability they had shown, expressed the gratification he had experienced, in common, he was sure, with all present, in perceiving that nothing had been said which could in any way affect the noble character and high merits of Dr. Kane; for it was chiefly the account given by Morton as to the extent of his rapid excursion northwards which had been called in question. Again, as respected the formation of the Greenland glaciers, Dr. Rink, who had studied them for several years *in situ*, had long ago published his views upon that subject.

In answer to a question from the Chair—

SIR GEORGE BACK said—I hardly know how to answer that question, because Dr. Rink, in speaking of the Humboldt Glacier, does not throw any doubt upon its formation, or the similarity of its formation to any of the glaciers in Omenak Bay. I think his idea is, that it does not extend 1200 miles, or as Dr. Kane supposed from where he saw it to Cape Farewell. He gives it as his opinion that the glaciers inside first fill up the valleys, gradually accumulate until they cover the hilltops, and then form plateaus; but with eight or nine years' experience, it appears he was unable to ascertain their extent.

Eleventh Meeting, Monday, April 26th, 1858.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS.—*The Right Hon. John Wynne, M.P., and Dr. John Shea, R.N., were presented upon their election.*

ELECTIONS.—*Major-General Duncan Alexander Cameron, C.B.; the Hon. Henry Coke; Captain J. Somerfield Hawkins, R.E.; the Ven. Archdeacon, Hugh Willoughby Jermyn; Dr. John Lister; and J. N. Fazakerley; John Robert Godley, Assistant Under-Secretary of the War-Office; Thomas Guisford; and George Stoddart, H. M. Consul at Madeira, Esqrs., were elected Fellows.*

ANNOUNCEMENT.—It was announced that Captain Irminger, of the Royal Danish Navy, had written to state that letters addressed to Captain M'Clintock, and the officers and crew of the Arctic expedition, might be forwarded to Greenland via Copenhagen.

The Paper read was:—

On the Importance of opening the Navigation of the Yang-tse-Kiang, and the Changes that have lately taken place in the Bed of the Yellow River, &c.

By WILLIAM LOCKHART, Esq., F.R.G.S.

MR. LOCKHART'S paper has been compiled from various sources, free use having been made of Biot's description of the cities of China

and of Dr. Williams's 'Middle Kingdom,' as well as of several native authorities and native maps.

He begins by showing the paramount importance of the Yang-tse-Kiang River as an inlet into the Chinese empire. It traverses the whole of its centre, it passes through its most fertile provinces, at least 100,000,000 of people live upon its banks, and it is the highway of an immense commerce. He contrasts it with the Hoang-ho, or Yellow River, which, turbid and rapid, and constantly bursting its banks and devastating its neighbourhood, is called by the Chinese "The grief of the sons of Hon."

The Yang-tse-Kiang rises in Tibet, and enters China at the richest metallurgical province of the whole empire, from which point down to the sea its course and tributaries are traced in Mr. Lockhart's paper. Between the provinces of Hu-nan and Hu-pe, where coal and iron are extensively worked, its volume is doubled by numerous affluents that drain an enormous territory on either hand. Three immense cities lie close together at the confluence of the Hankiang, 500 miles from the sea, where the river has a breadth of from two to three miles, and depth of water amply sufficient for vessels of from 300 to 400 tons. The names of these cities are Wouchang-fu, Han-yang, and Han-chow. Before the late rebellion they contained between them 5,000,000 of people. The great barter trade between the northern and southern provinces of China passes through Han-chow, and the traffic from the three cities is immense, and reaches in all directions to the most distant parts of China. Mr. Lockhart considers that access to this district ought certainly to be secured to us: it appears to be the most important mart in Asia; half the Manchester and Leeds goods that are sent to China have already found their way there. If a line of European commerce were opened, sea-going ships would leave their cargoes at Shanghai, and steamers would be employed up the river.

At 400 miles from the sea the tides are perceptible: the large American steam-frigate *Susquehanna* reached a point 300 miles from the sea, and the British fleet in 1842 anchored off Nankin, the old capital of China, which is 200 miles from the coast.

The volume of water in the Yang-tse-Kiang is much greater in summer than in winter, owing to the melting of the snows and the heavy rains.

The Hoang-ho, or Yellow River, is rapid, tortuous, and turbid with mud, deposit of which has raised its bed to a greater height than the country through which it flows. It is useless for navigation. The continual repairs necessary to keep its banks in tolerable security create an immense drain upon the Imperial

treasury, and having been comparatively neglected since the outbreak of the rebellion, a fearful disaster occurred two years ago. The river entirely broke loose from its previous bed, and after inundating a large part of the province of Shan-tung, its erratic waters have found a new exit to the ocean in the Gulf of Pecheli.

Mr. Lockhart's paper closes with an account of the rise and progress of the Chinese rebellion. It would appear that its force has become greatly expended, and its ultimate success very questionable.

The PRESIDENT called upon Captain Collinson and Captain Vansittart to state their opinions respecting the navigability of these rivers, particularly the Nankin River, which was navigated by British ships during the late war, and which a former President of the Geographical Society, Lord Colchester, ascended in boats to a distance, he believed, of 200 miles higher than any other officer. There were questions which as a geologist he should like to put to Mr. Lockhart. Whence came the coal which was found piled up on the quays near Nankin, when our steamers ascended that river? Whence came the fossil shells which Mr. Lockhart had given him—shells which established a complete identity between the formations in the centre of China and those of Belgium, Germany, France, Russia, and our own islands?

CAPTAIN R. COLLINSON, R.N., F.R.G.S.—Nearly all I have to communicate has already appeared in the memoirs of this Society, published on my return in 1846, in conjunction with Lord Colchester. The knowledge we personally obtained bears out to the fullest extent the opinion of Mr. Lockhart, that we have in these rivers the means of penetrating into the interior of the country. There is nothing I conceive which can tend more to the establishment of peace and amity between that vast country and our own, than that we should exhibit our power by sending our steamers up into the interior by means of the Yang-tse-Kiang. That it is capable of navigation up to Nankin for line-of-battle ships has been proved beyond a doubt. Beyond that we do not know exactly what is the depth of the river; but reasoning from analogy we can prognosticate that steamers will go more than 1400 miles above Nankin. With respect to coal, it is the fact that we found the coal ready piled for our use on the banks of the Yang-tse-Kiang at Ching-kan-fu and Nankin. The change of course in the Yellow River, mentioned by Mr. Lockhart, must be peculiarly interesting to geographers, showing how necessary it is, in dealing with the drainage of an extensive country like that, to give attention to its physical condition. It appears that the Chinese have gone on building up a course for that river until they have actually raised the river above the surrounding country. The consequence has been that it is a source of great disaster. In addition to the introduction of steamers into the interior, I believe one other great advantage which will result from the onslaught we are now making into China will be to show how they can get rid of their water better than they have been able to do hitherto.

CAPTAIN E. W. VANSITTART, R.N.—With respect to the trade of the Yang-tse-Kiang, I have had opportunities lately, that is in the year 1855, of seeing thousands of junks coming from the north and passing up that river. On one occasion in the gulf of Leotung, not far to the north of Peking, we found more than 700 junks deeply laden, of the value of from 1000 to 2000 dollars each, which were coming south. These vessels would return north again with British goods obtained from Shanghai. The importance of this trade has yet to be developed, and steam will be the means of doing it. With respect to the trade with the north, I think a light woollen cloth would answer much better

than a more expensive article. In the city of New-Chang, north of Peking, the people can scarcely bear the severity of the winter; and no doubt if they could get a cloth cheap, such as they obtain in a roundabout way from Russia, they would be glad to make use of it. With reference to the trade of the Yang-tse-Kiang, it would be well to take notice of the impediments to it caused by hordes of pirates, who have been assisted by renegade Englishmen and Americans. When the value of the trade is discovered (I have found junks laden which the natives themselves estimated to be worth 30,000 and 40,000 dollars), I have no doubt that the extreme peril to which that trade is exposed will be taken more notice of, and that the pirates will be entirely suppressed. I had the honour of belonging to the expedition which went as far as Nankin in 1842, and I can bear testimony to what Captain Collinson says as to the immense quantities of coal piled up by the Chinese, which our steamers made use of.

MR. CONSUL ALCOCK.—Mr. Lockhart has drawn the attention of the Society to that part of our relations with China which I think certainly most interesting and important—that is, to the geographical features of the country, and its influence on our commerce. I think it was Professor Owen who some time ago remarked that the physiological and geographical condition of a country had more to do with its character, its liberty, its commerce, than perhaps any other feature. It is an observation which I think we too often lose sight of. In China particularly is this remarkable. By referring to the map it is very easy to demonstrate this truth. There is a great chain of mountains running down from Ningpo to the southern coast, which renders it quite impossible for any extensive trade to be carried on from those ports intervening between Ningpo and Canton, inasmuch as the rivers throughout that extent of country take their rise from opposite sides of the mountains. But by obtaining access into the interior by means of the Yang-tse-Kiang you come in contact with an extensive tract of the finest country in the world. The banks of this noble stream are thickly covered with populous cities, and thousands of junks are to be seen sailing up and down its waters conveying the produce of one part of the country to another. The Yang-tse-Kiang stands unrivalled by any other river in the world as regards its population, its wealth, and the enormous traffic that takes place. It is difficult to bring statistics to bear upon matters connected with trade, or with any other subject, even with population, in China; but I am quite satisfied from what I have seen and from all the knowledge that has reached me, that we have no conception in England of the vast extent of the inland traffic of China. There is a greater trade carried on between the eighteen provinces of China than between all Europe and the rest of the world. If we wish to have a share of that trade, and to carry on a commerce that shall be mutually beneficial, we must get the right to traverse that great stream, the Yang-tse-Kiang, to which Mr. Lockhart has so ably drawn our attention. We must go up to Hang-chow, a city which extends some twenty miles along both sides of the river. There alone we should find a new market for our manufactures, and a means of distributing them in the interior among millions who have never heard of them. Although some of our goods may go up the country, I am certain the great bulk do not extend a hundred miles beyond the ports where they are landed. In my opinion we shall never make any progress until we have gained these two points—free access to the tea and silk districts and the central marts there, and the right to traverse the Yang-tse-Kiang and to enter the great cities on its banks. As regards our political relations, I think until we have direct relations with the court of Peking, based upon a rational footing, that we shall always be met by anomalies and contradictions. With these points gained, the whole of China would be opened to us, and our commercial hopes, which have hitherto been doomed to disappointment, would I believe in a few years be more than realised.

MR. JOHN CRAWFURD, F.R.G.S.—I have never been in China, but I have had much intercourse with Chinese, have even exercised authority over them, and, therefore, know them tolerably well, and I have even made China itself in some measure a study. The Chinese are a very ingenious people; they invented tea, porcelain, paper, and printing; but they have never been able to put two syllables together. That is a remarkable fact. Their oral language is extremely poor; but they have a written language which I believe is tolerably copious, hieroglyphics like our numerals—a language understood by the eye and not by the ear. The oral languages are said to be no fewer than eighteen, corresponding with the eighteen provinces of the empire. I am given to understand that not one of them contains more than 1200 words; that is to say, not more than one-fortieth of the number in our own language. I have seen a Chinese play, and the language is so imperfect that the actor has been obliged to cut a hieroglyph in the air with his fan to indicate what he meant. With respect to the Yang-tse-Kiang being the largest river in the world, it is not so; but it is certainly one that has the greatest population and the greatest amount of industry on its banks. I think the population of its great plain is somewhere about 100,000,000, or about three and a half times the population of the United Kingdom. In stating that the internal trade of China exceeds the trade of the whole of Europe with the rest of the world, I think Mr. Alcock has considerably exaggerated the real state of the case. From what I know of the Chinese, I believe it does not amount to one-tenth part of the internal commerce carried on by the nations of Europe among themselves, apart from international commerce. One advantage to us of the Yang-tse-Kiang consists in its affording us the means of controlling the Chinese, and dictating to them terms of fairness and justice in our intercourse. We availed ourselves of this means on a former occasion, and in my opinion we shall be obliged to do so again. The objection to going up the Yang-tse-Kiang, I am told, is that the Tye-pings, those vagabonds who have been in rebellion for six or seven years, who are far more barbarous than the Chinese themselves, and who are making a burlesque and tool of Christianity, are in possession of Nankin. No terms should be held with these people. What are the Tye-pings to us? We know nothing of rebellion in China; we recognise nothing but the legitimate government. If the Tye-pings oppose us, we must knock the Tye-pings on the head. One word upon the question of silk, and the vast importance of it to this country. When the commerce of China laboured under a monopoly, it was thought to be totally impossible to increase the quantity of silk obtained from that country. The annual export was 2000 bales, and for 150 years it was thought to be the utmost that China could supply for exportation. When the monopoly was broken up 10,000 bales were obtained; then 14,000 bales. Within the last two years, in consequence of the failure of the silkworm in Europe, the supply from China had enormously increased. Last year it was 94,800 bales, showing that the supply had increased forty-seven fold since 1810. In the history of foreign trades there is not a more remarkable fact.

MR. CONSUL ALCOCK.—I do not speak altogether without proof upon the subject of the internal trade of China. In the port of Shanghai there have been as many as four thousand large junks at one time. It is estimated, and has not been called in question for the last century, that from three hundred to three hundred and sixty millions inhabit that vast territory. There is a larger population than all Europe to begin with, and taken as a whole they are the most industrial and productive race in the world. They are essentially a commercial and trafficking race. You cannot go on to any canal, large or small, in any direction, without seeing thousands and thousands of boats carrying the produce of one district to another. They are a self-sufficing race, possessing as they do every production and every soil. They are in truth the

only race in the world that can be independent of every other race, as they produce everything within their own regions that man can desire, and they freely interchange them. Their coasting trade is enormous; there are hundreds of thousands of vessels passing up and down. Mr. Crawford made one or two observations with reference to our operations up the Yang-tse-Kiang in order to compel the Court of Peking to listen to our terms, and he referred to the very triumphant course of our expedition up that river in 1842 and 1843. I think he lost sight of the total change in circumstances. When we went up the Yang-tse-Kiang originally, and blockaded the mouths of the Grand Canal, it was like putting our hand upon the throat of the empire; for by the Grand Canal they were in the habit of receiving all their supplies of food, and up to that time Peking was mainly dependent for provisions upon the southern provinces. We were in a position also to blockade the coast. In the novelty of their position, with Peking threatened and the Manchu dynasty imperilled, it was no wonder they should instantly come to terms. The circumstances are very different now. The rebels have been in possession of the mouths of the Yang-tse-Kiang for the last five years; therefore whatever mischief has resulted to Peking from the loss of prestige and the cutting off the supplies by the Grand Canal has already been put upon them. How should we add to the pressure by going there too? We should only come in contact with the insurrection, the limits of which we could not foresee. It is certainly not desirable that we should come in immediate contact with the rebels, or enter into relations with them. There are strong reasons why we should not mix up ourselves with them, and there is no hope that our going there would in a political sense have any influence upon the people of China.

DR. M. TRUMAN, F.R.G.S.—I may state, in corroboration of the assertion that our manufactures have not penetrated far into the interior of China, that most of the British goods taken to Shanghai are sold to pedlars, who carry them on their backs. It is not likely that these men taking such small packets could travel any very great distance. Another peculiarity about our trade with the Chinese is, that there is more of bartering than of commerce. They are disinclined to part with silver in purchasing our goods, and our merchants are in fact obliged to receive the produce of the country. Works of art have even been taken in exchange for our manufactures, and a number of curiosities brought to this country have been sold at good prices and produce large profits. I recollect on one occasion a friend of mine was obliged to accept a large quantity of rhubarb. He had some doubt whether it would find a good market in England. It turned out, however, to be of such excellent quality that he was perfectly satisfied with the arrangement he had made.

The system of barter in China operates as a great obstacle to large commercial transactions, and nothing would tend more to increase our trade with the Chinese than inducing them to pay for the goods they purchase of us with specie, which at present they are extremely reluctant to do, keeping their silver and other precious metals hoarded up in their houses.

In answer to a question—

MR. PLINY MILES, of the United States, said—I believe the number of Chinese who have gone to St. Francisco and different parts of California have for several years amounted to from 10,000 to 13,000 annually. Within the last three years that number has considerably declined in consequence of certain political reasons. As to the number that has gone to Panama to reside, I do not believe it has exceeded fifty during the last five years. With regard to Peru, I think those who have proceeded there have gone almost entirely under contract with guano ships; but to California it has been a voluntary emigration. There are several Chinese merchants at St. Francisco, and they have sent out vessels or money to China to bring over their countrymen. The complaint against the

Chinese in California is that they seem more disposed to save their money than to spend it. They will not gamble or throw away their money foolishly. I do not wish to speak against the laws and regulations of my own country, but there are one or two circumstances connected with the Chinese on the Pacific coast which have more than a geographical interest. When there was a recommendation from the Governor of California to place some restrictions on the Chinese coming there, to make them pay a heavy tax, not in proportion to the trouble they put the State to, but in proportion to the amount of money they were supposed to lay up, the Chinese very justly remonstrated against it, and they drew up a paper, which was conceded to be a much more able document than the one which emanated from the Governor himself. At any rate the Legislature did not pass the law. I will make one remark with reference to the Chinese river system. It has both a commercial and geographical signification. Geographically speaking, the river system of China is very similar to the river system of North America. Perhaps in civilised and commercial countries there are no two rivers so nearly alike as the river Yang-tse-Kiang and the Mississippi. But there is this difference, that while one has a population of 100,000,000 on its banks, the other has not more than 10,000,000 or 12,000,000. Now, when we come to consider the immense number of steamers running on the Mississippi to supply the wants of those 10,000,000, we can form some idea of the enormous number of vessels there must be on the Yang-tse-Kiang to supply the wants of that vast population of 100,000,000 or more. The Mississippi and its tributaries have in constant employment more than one thousand steamboats, and many of these of very large size. The Wabash canal connects the navigable waters of the Ohio with the great chain of lakes in the north, but there have been no railroads of any extent near these rivers until within the last six or eight years. The figures given of the number of steamers on the great river intersecting the interior of North America apply to a period before the main stream was intersected by one canal, before the whistle of the locomotive was heard on its banks, and before the entire valley had one town of a hundred thousand people. Were the same class of steamers introduced on the Yang-tse-Kiang that run on the American rivers—vessels drawing from 13 inches to 3 feet of water—it would inevitably give an enormous impetus to the traffic of that great river.

MR. GEORGE RENNIE, F.R.G.S., quoted the opinion of a correspondent as to the amount of trade that would result from navigating the great rivers which traverse the interior of China, and the importance of opening out that trade by means of vessels such as the gunboats recently sent out by him to India, which only draw 2 feet water; and with reference to the Yang-tse-Kiang said, that, if not the largest, it was the longest river in China—it was 2800 miles in length, and it drained a basin of 136,800 square miles. The Amúr river was only 2380 miles in length, but its basin was 145,000 square miles. The Hoang-ho was 2230 miles long, and it drained a basin of 134,400 square miles.

CAPTAIN E. W. VANSITTART, R.N.—A question has been asked about the Chinese emigrants. I have seen them shipped at Swatow, and so far as I have seen they are placed very comfortably on board, and seem very happy to go. One of the gentlemen who criticised Consul Alcock's remarks about the extent of the internal trade of China, also made some remarks about the barbarities of the rebels as compared with the conduct of the Imperialists. We have all heard what Commissioner Yeh did at Canton. All I can say, in confirmation of the Imperialist barbarities, is this, that upon the retaking of Amoy they executed some 1400 in about fifty minutes, until the very sea round us was covered with blood; on landing upon the wharf I had the gore running over my shoes.

THE REV. W. C. MILNE.—The paper which my friend Mr. Lockhart has laid before us this evening has brought to recollection many of my most intimate associations. But to refer briefly to the theme of that paper, he has

described the grand plain of China, and the commercial importance of that part of the country. Upon the latter point the Chinese themselves admit that their four most important marts are in the interior. In this remark of theirs they do not refer to the seaports, but to distinct inland marts. These are Fuh-shan, called in Canton patois *Fat-shan*, which has recently been visited by the British forces; *Chu-sin*, 12 miles from *Kai-fung-fú*, on the banks of the Yellow River; *Han-chow*, and *King-tih-chin*—three of these markets lying in the plain of the *Yang-tse-Kiang*. Every one who looks at the state of the case must view with the greatest anxiety the results of our present onslaught at Canton; and we cannot but believe that the ultimate result will be the opening of the great plain of the "Flowery land" to foreign intercourse of every description. We shall find there opportunity enough for adventure and enterprise, as well as for the advancement of commerce and civilisation.

MR. B. WILLIAMS, F.B.G.S.—Allow me to say one word after the remarks the gallant Captain has made. He said, I think, that we had not gone up the river beyond Nankin. Perhaps he is not aware that Captain Fishbourne of H.M.S. *Hermes* sent a boat 9 or 10 miles above that city in the year 1852. My son, now Lieutenant Frederick Williams, had command of that expedition, and found in that distance that the river varied in width from half a mile to between 6 and 7 miles, and that in places there was only depth for a steamer of very light draught of water. Captain Fishbourne has published his observations on the moral and social condition of China.

I think, Sir, with your permission we ought to make some slight protest against the remarks of Mr. Crawford. He designated the rebels rather harshly. According to Captain Fishbourne they have, at any rate, overthrown idolatry. They receive the word of God with the greatest deference and eagerness. They call us brothers, and they are themselves engaged in printing the Bible to a very large extent. So far there seems to be an incipient degree of civilisation, to say the least, amongst them.

MR. CRAWFORD.—A few words with reference to what I said about the Imperialists and rebels. I did not say that the Manchús were a civilised and humane people. I said the rebels were barbarous. I believe they are both of them barbarous, and I see only a small distinction in favour of the Manchús. I think I am entitled to say so much, because the Manchús have governed China 200 years; and on the whole they have governed it better than any other Asiatic state has been governed. With respect to the Tye-pings, of whom some gentlemen are disposed to think favourably, I cannot think favourably of a people that destroy whole cities and massacre the inhabitants in cold blood, for this they have done over and over again.

MR. LOCKHART.—Twenty cities.

MR. CRAWFORD.—And as for treating with them, Sir George Bonham went up to Nankin, and endeavoured to hold intercourse with them; and they were too proud even to give him an interview. The principal leader calls himself the Brother of the Saviour! What respect can be entertained for a party that uses or believes such abominations? For six years these people have been committing murders and devastation, but they have made no essential progress. They crossed the Yellow River five years ago; they were beaten by the Manchús; and out of an army of 40,000 men, only 5000 returned to Nankin. There they have continued ever since in possession of a small part of the country around Nankin, beyond which they have made no progress whatever. I really do not see that we should be interrupted by a people of that description. I have one observation to make with reference to what fell from Mr. Alcock. He thinks that our intercourse with China cannot be carried on satisfactorily unless we have a legation at Pekin. From that opinion I totally dissent. I have been myself in a position somewhat similar. I was once sent as an envoy to the Birman Court, which is 400 miles up the Irrawaddy, and

1400 miles from Calcutta. I found myself completely isolated. I was treated with distrust and suspicion, and I found my situation there so uncomfortable that I strongly recommended to the Government to withdraw the mission. They did not, but persevered for several years in maintaining one. At last the envoy was kept four months on an island in the Irrawaddy without being even vouchsafed an audience, until the whole party fell sick, and then the Indian Government came to their senses and permanently withdrew it. Now, an envoy sent to Peking, 1000 or 1200 miles from the seacoast, and 15,000 or 16,000 miles from Great Britain, would be in a much worse position than I was; and I am perfectly sure that any attempt of the sort will prove a total failure.

THE PRESIDENT.—One of the remarkable facts pointed out by Mr. Lockhart has not been alluded to in the discussion,—the change of the course of the great Yellow River. By not keeping up its raised banks, that river has entirely changed its course. It was stated that this was a phenomenon almost unparalleled; but I must remind my friends, that the Oxus, a very mighty river, is supposed by Humboldt to have also changed its course; and that, having formerly flowed into the Caspian Sea, it was by some slight change of the land deflected into the Aral. Also in our own times the river Syr Daria, at the southern extremity of the Russian steppes, has equally been diverted into a new channel.

MR. W. LOCKHART, F.R.G.S.—In respect to the remarks on the language, I wish to state that it is not correct that either the spoken or written language of China is defective or imperfect: when properly spoken, it is as intelligible as other languages, and the action used in dramas, is not to supply the want of elocution, but rather to illustrate the subject. If the Yang-tse-Kiang is not the longest river in the world, being 3000 miles long, it is certainly the most important, having so many populous cities containing 100,000,000 of people on its banks, and because it traverses the centre of so rich and productive a country as China is. In answer to the gentleman who says that the trade is carried on in China by a species of peddling, I remark that this is not the case, for the trade in China is characterised by larger transactions than are common in other countries, which is evident when it is borne in mind that the trade of Shanghai alone in exports, is about 12,000,000*l.* sterling per annum, paid for by Manchester and Leeds goods, bar silver and opium. The lacquer-ware and rhubarb form a very subordinate branch of the trade. The Chinese who buy silk and tea in the interior are largely trusted by the merchants sending them, who commit to their care large sums of money, for which after some months' interval the produce is sent to Shanghai. As to Mr. Crawford's remark that he hoped there would not be a British Minister at Peking, I, on the contrary, most fervently hope that in any new treaty the Government will not only secure the navigation of the great rivers, but will insist on the residence of a minister at Peking, as without that, we could not secure friendly relations with China. If this be not obtained, we should as in the present instance be soon hurried into another war, the chief cause of the present war being the impossibility of communicating with the Court of Peking when any troubles arose at the ports. I hope when entrance is obtained to the interior that a rigid system of passports will be established; that no person will be allowed to enter China who is not answerable to the control of some consul at the ports, otherwise the same thing will occur in the interior as I have known take place near Shanghai, namely, that half a dozen Europeans and Americans, under the name of Germans, who have no consul there, banded together, took a walled city, levied contributions on the inhabitants, and retained possession for many months, the Chinese authorities having no power to displace them.

Twelfth Meeting, Monday, May 10th, 1858.

COLONEL GEORGE EVEREST, VICE-PRESIDENT, in the Chair.

PRESENTATIONS.—*Augustus F. Birch; Edward Burmester; John Lister, M.D.; James Ewing Matheson; John H. Nix; and Thomas G. Staveley, Esqrs., were officially presented upon their election.*

ELECTIONS.—*Viscount Stratford de Redcliffe; the Rev. Charles John Armistead, Chaplain, R.N., Hong Kong; and Thomas Braddell, Magistrate of Penang; Augustus H. Chetwode; John Pole Mayo; Charles Edward Mudie; R. Banner Oakley; L. E. R. Rees; Conway M. Shipley; and Joseph Somes, Esqrs., were elected Fellows.*

EXHIBITIONS.—Major Papen's Geological Map of Central Europe, by Ravenstein; two Coloured Views, illustrating Bourne's new System of Indian River Navigation; and Views of Honduras, showing the Route of Inter-Oceanic Railways, were exhibited at the Meeting.

ANNOUNCEMENTS.—The CHAIRMAN reminded the Fellows that the Anniversary of the Society would be held on Monday, the 24th instant, at the Society's House, 15, Whitehall-place, at one P.M., when the Royal Medals would be presented to Captain Richard Collinson, R.N., C.B., and to Professor Alexander Dallas Bache, of the United States Coast-survey, by the President, Sir Roderick Murchison, who would then deliver the Annual Address on the Progress of Geography; and in the evening the usual Dinner would take place at the Freemasons' Tavern, at seven o'clock, and those gentlemen, who purposed supporting Sir Roderick, were requested to apply at the Society's Office for tickets as early as possible.

The Papers read were—

1. *Notes on the Physical Geography of North-West Australia.* By MR. JAMES S. WILSON, Geologist to the North Australian Expedition.

Communicated by SIR RODERICK I. MURCHISON.

A CONTINUOUS table-land runs parallel to the whole coast of North-Western and of Western Australia. It begins at the North-West horn of the Gulf of Carpentaria, and ends at Cape Leuwin, the South-West corner of the continent, and its summit averages 300 miles from the sea, and 1600 feet of altitude above it.

The rocks that compose this table-land belong to the carboniferous era, are marine deposits, and have undergone frequent submergencies since their first elevation. They consist of four strata: 1st, A red

ferruginous sandstone, originally 300 feet in thickness, but which has been largely denuded by the sea, that has drifted its mud to lower levels; 2ndly, A compact siliceous sandstone, with hardly a trace of stratification, which forms the surface of the many flat-topped hills met with in the country; 3rdly, A clay slate, that decomposes into a reddish clay and a very productive soil; and 4thly, Limestone. The general dip of all these is to the North-West.

The Plains of Promise, and many other low plains that border the sea-coast, are formed of red sandstone, which has been degraded by the sea subsequent to its first formation, and has been drifted and deposited anew in its present station. Most of the islands in the Gulf of Carpentaria are of the same nature. This kind of soil is occasionally covered with a productive alluvium, but is poor and unfertile in itself. Where the second stratum, the compact sandstone, has been cut through by rivers or by ancient sea action, the shale below is deeply worn away, and even now the sides of the ravines may be observed to be continually undermined and the hard overlying rock breaking off and falling in. In this way are formed the extensive plains that run parallel with the dividing ridge and the coast, but separated from the latter by detached masses of cliff-topped hills; their soil consists of a rich and deep clay, through which the limestone sometimes protrudes. Trap plains occur in the higher part of the table-land.

Perhaps on no part of the Australian coast are there so many rivers navigable to a distance exceeding 50 miles from the sea. Of these are the Victoria; the Glenelg, whose mouth is still unknown; the Prince Regent River, the Adelaide, and the Liverpool.

The Meteorological Register that was kept at the camp on the Victoria River, lat. $15^{\circ} 30'$ S., gives the following results:—

	Mean Temperature at			Max.	Min.	Rainy Days.
	°	°	°	°	°	
October .. 1855	..	..	..	..	..	1
November .. ,	81·0	100·0	93·0	106·0	69·0	12
December .. ,	79·0	94·0	87·0	105·0	73·0	20
January .. 1856	78·0	94·5	86·0	104·0	71·0	15
February .. ,	78·3	92·3	86·5	99·0	75·0	19
March .. ,	79·3	96·0	89·5	102·0	75·0	8
April .. ,	75·3	91·2	85·3	98·0	69·0	6
May .. ,	66·6	91·8	84·7	96·0	60·0	0
June .. ,	59·0	84·4	77·5	97·0	47·0	3
July .. ,	59·0	87·0	80·0	97·0	49·0	..

North Australia is eminently a grassy country, not only from the abundance of its grasses, but from their variety. In no part of

the world has the author seen grass grow so luxuriantly. Timber for rough purposes is abundant: it consists chiefly of inferior kinds of eucalypti. The edible fruit-products are numerous; three sorts of figs, two fruits resembling grapes, the *Adansonia*, wild rice, wild yams, and a production like potatoes. The quadrupeds are the same as those in the south; the birds are different. An immense gathering of migratory bats, nearly as large as flying foxes, were once observed; they were millions in number, and extended to a mile, darkening the air, bending down the branches of the trees by their weight, and diffusing a musky smell. Some curious kinds of fish were met with; one that caught flies by squirting a little jet of water upon them as they settled upon leaves 2 or 3 feet off, and washing them into the river; and another that appeared amphibious, elbowing itself across sand or rock with its fore fins, and now and then making a bound. The natives are not numerous, and are clearly of the same race as those in the South. Some break out their two upper front teeth, and some circumcise. They have no huts, but live under screens of boughs. Circular stone structures are occasionally found on hill tops; they appear to be lookout stations. The natives carry no other arms than spears; one kind is short, like an arrow, for killing birds, another is long and pointed with stone, a third is barbed for catching fish. Few, if any, boats or canoes are used by them; they sit astride on logs of wood when they cross rivers, and, in the Gulf of Carpentaria, they employ large raft-like bundles of the dead stems of mangrove trees.

The CHAIRMAN.—We are, I think, greatly indebted to Mr. Wilson for the interesting paper which has just been read, and I very much regret that our estimable President is not in his place to render full justice to the valuable geological details which it contains. For my own part I am free to avow, that though, from the description given, I can form a general idea of the nature of the tract described, yet I feel by no means sufficiently master of the subject to offer any remarks worthy of the notice of this Meeting. It is evident from Mr. Wilson's description, and we have also learned from the statements of Mr. Gregory and other sources, that in Northern Australia there are vast tracts of valuable land at present lying waste which are admirably suited for pastoral purposes, and, perhaps, for those of agriculture; but the serious question which we have to solve is how those tracts are to be made available to humanity. The fact stares us in the face, that they seem to be limited by the 18th parallel of latitude; and we may, I think, lay it down as an universal rule, that within the tropics the English race cannot colonize, unless the climate be moderated by elevated lands, such as in the case before us do not exist; that is to say, that they cannot cultivate the land and labour in the fields. True, they may superintend with efficiency the labours of others, just as we know the indigo planters in India, the sugar planters in the West India Islands, the growers of cotton in the southern parts of the United States are used to do, but that is not, strictly speaking, colonizing; for the outdoor work, and all toil needing protracted exertion in the open field, are in all these instances performed by natives of another region,

better adapted to stand exposure to the extreme heat of the sun and the vicissitudes of the climate. If the slave-trade were still in its flourishing state, there would be a ready mode of evading this difficulty, for we should then only have to open a communication with the slavers of the African coasts and the piratical rovers about Borneo, Celebes, and other places in the Malayan Archipelago, and obtain as many *human implements* as enterprising individuals might desire; but fortunately this once *highly prized traffic* no longer exists as a recognized and legitimate trade. We might obtain Chinese labourers, perhaps, sufficient in numbers and with hardihood adequate to cope with a tropical climate; but if we are to trust to the statements given in the newspapers from time to time, we cannot but conclude that there are already too many of that exclusive and singular race in Australia, and rather than augment their number, a counterpoise is needed to keep their arrogance within bounds. They are, by all accounts, a people whose habits never can harmonise with those of Europeans; they can never become loyal subjects of Great Britain, but always form, wherever they go, a community of their own—an *imperium in imperio*, in fact. Are we then to view this land of mineral, pastoral, and arable capabilities at a distance, as a mere curiosity, like the mountains in the moon, or the belts of Jupiter, or the ring of Saturn, and turn it to no account, and this, too, whilst it is within our clutch, forming part of the dominions of Great Britain, and of the inheritance of our descendants? Is it for this that toilsome and costly expeditions have been organized and sent forth just to say *veni, vidi*, and then to leave our hopeful discovery as we found it, to be possessed by a wretched set of unredeemed and irreclaimable savages, who turn these natural advantages at their disposal to no account, but live upon snakes and such other reptiles as are witless enough to allow themselves to be caught napping within reach of their bumerangs and spears, and girdle themselves with belts in order that they may take in or let out a reef, according to the state of their larder? I think you will answer, Certainly not. The plan which I think we ought to adopt is to make in this tract a penal settlement for natives of India, and the time is now most fitting for giving effect to this arrangement. We have had a tremendous rebellion in India. We have slaughtered, and our countrymen and women and children have been slaughtered, to a most fearful extent; and though I have not a word to say in behalf of those who have imbrued their hands in the blood of the innocent, helpless, and unarmed, yet many, I feel assured, there are amongst those now in arms against us who have been merely playing the game of follow-my-leader, and had in the origin no notion whatever that things would have come to such a frightful pass. Those who know anything of the natives of India, and particularly of the class of whom the Bengal army was composed, must be aware that a very large portion consists of what the French call *gobemouches*, a set of credulous gabies, without innate mischief in their composition, who go to stare at a spectacle just as the dirty boys in London go to see Punch beating and killing his wife, but without any desire to assist, aid, or abet in the cruelties, atrocities, and murders perpetrated. Now, I confess I should be very sorry to see these people indiscriminately put to death. Down with the Budmashes! Down with the actual murderers, or the participators in any of the wanton atrocities committed; but wherever we can winnow the simple *Tomashabins*, or sight-seers, from the mass, let them be preserved as the nucleus of the colony I suggest. They would be most admirably suited to inhabit the tract of country so highly spoken of in Northern and North-Western Australia, which is so peculiarly adapted to their constitutions. They are in general accustomed to agricultural pursuits; some few are shepherds; and they would soon become habituated to their new kind of life, especially as the climate seems to be, as nearly as we can judge, just what they have been inured to

from their birth. This, I think, is the very best, if not the only, means by which we ever can redeem those beautiful tracts of land regarding which we have this night, and on so many previous occasions lately, had our interest excited, from their present forlorn and desolate state; and if this succeeds as a first attempt, we may then have some hope of developing their resources, with advantage to Great Britain and her descendants, and to mankind at large.

MR. TRELAWNY SAUNDERS.—The author of this paper has given us some interesting generalizations on the structure of North Australia. He finds the hills running parallel to the coast on the north-west, as they do on the eastern seaboard. Flinders commenced the observation of this fact half a century since in reference to the Wessel Islands at the entrance of the Gulf of Carpentaria. It was afterwards commented upon by Dr. Fitton in his appendix to King's Australian Voyages. Leichhardt next found the range which he crossed near Port Essington pursuing the same direction; and Wilson has now observed the same feature still farther south.

Mr. Wilson adopts Captain Sturt's views with regard to the interior. He also thinks that the range on the north-west of Spencer Gulf stretches across the continent to the elevated country on the North-West coast. So far as the climate of the interior is concerned, it seems to me that Captain Sturt's journeys, and the appearance of the Western coast, confirm its similarity to the analogous region of Northern Africa. Like Northern Africa, Australia presents a broad extent of land intersected by one of the tropics, and exposed to the prolonged influence of the vertical sun during the solstice. Burnt up at one season of the year, it may be deluged at the other without retaining any source of water like the Nile or the Ganges, capable of resisting the intolerable heat and dryness so impressively described by Captain Sturt.

With reference to the important question of establishing settlements on the North coast, I think we should follow the precedent set by Sir Stamford Raffles in the highly successful occupation of Singapore.

If the Government would form a small establishment on the spot for the survey, allotment, and sale of land, and for the maintenance of civil authority, those people would find their way there, as they did at Singapore, who deemed themselves best fitted for such a country. The population of North Australia whenever it springs up will necessarily be Asiatic as well as European. The native traders of the Archipelago will there meet with European merchants and colonial cattle owners. No direct migration of European labourers is desirable.

The failure of Port Essington arose from its having been regarded and governed as a purely military post. The Australian colonists who would have driven their cattle to that part of the country were expressly prohibited. The native traders of the Archipelago looked upon it as a stepping stone to some encroachments on the adjacent islands; and the settlement was broken up as soon as its peaceable nature was perceived and traders began to frequent it. There can be no doubt that population and trade would speedily be attracted to North Australia if titles to land were procurable, and civil authority duly established.

MR. JOHN CRAWFURD, F.R.G.S.—I think it was stated that the highest land discovered is about 1600 feet, and that the distance of that land from the sea is about 300 miles. It is clear, then, that there can be no great river in a country of that description. No great rivers exist in any part of the world, and especially the tropical world, except where there are great ranges of mountains from 10,000 to 12,000 feet high. No such mountains exist in any part of the Australian continent so far as we have been able to ascertain. It has been stated in the paper that there are 5,000,000 acres of good grass land; that it is a peculiarly pastoral country. Now what is a pastoral country? We usually understand by

a pastoral country a country fit for the production of the sheep, and the sheep in Australia is especially valuable on account of its fleece. Now, within the latitude of 12° and 18° , the fleece of the sheep will not be wool, but something very like hair. Therefore we may at once conclude that this country is totally unfit for the sheep. Then again the geological formation promises no gold, and it is the sheep and the gold which enrich Southern Australia. The country is perfectly well fitted as pasture for the ox, the horse, the hog. It would produce abundance of oxen, but what would you do with them, with nobody to eat them? It does not altogether follow that a tropical country is altogether unfit for an acclimated European. That we are perfectly satisfied of, from 300 years' experience in America. There are to be found on the low lands, on the level of the sea, in various parts of America, Europeans pretty much what their ancestors were when they left their parent country. I especially allude to the Spaniards. Only a night or two ago I saw a whole family of descendants of Spaniards who had been 300 years in America, and in the ninth degree of latitude, at Panama. One lady was exceedingly beautiful, and as fair as her ancestors when they left Toledo, for to that town the family traced its origin. Now, when Southern Australia, or such portions of it as can be occupied, is peopled to something like the extent of our own islands, namely, from 200 to 300 inhabitants to the square mile, its people will emigrate to North Australia and settle there. But they will not do so as long as they can find an occupation in the south. When that time arrives, which may be two or three centuries hence, then North Australia will be occupied, and will have its oxen, and its horses, and its hogs, and possibly a little corn. I have no great confidence in the assertion of the author of the paper when he states that a country of sandstone formation is a fertile country. Strangers are very apt to judge erroneously in this matter from mere appearances. The author of the paper speaks of having found a little rice in a few spots on the marshy sides of rivers. My opinion is that that rice is not a native production. I will tell you how I believe it came there. There are certain Malay fisheries carried on in the Gulf of Carpentaria. The fishermen bring their rice with them in the husk, commonly called paddy, and I dare say have thrown a few handfuls of it to the natives; and it has propagated itself in these marshes. But there can be no hope of raising rice in a country that is not well watered. When rice is grown on dry land the production is about one-fourth, one-sixth, and sometimes not more than one-tenth of what it is in a well-watered country, which North Australia can never be. As to settling the country with a Chinese population, that is not very likely to succeed. The Chinese never emigrate with the women, and how are they to multiply? So with respect to the convict Sepoys suggested by our Chairman; the women will not accompany them if they lose caste, which they will do when transported as murderers and assassins. Northern Australia then is not very likely to be colonised by Sepoys or by Chinese.

MR. LOCKHART asked how far the navigable stream Victoria extended towards the southward?

MR. SAUNDERS.—About 160 miles.

MR. LOCKHART asked what was the distance between the navigable part of the Victoria and the stations which had been passed over by Sturt from the south?

MR. GALTON replied, the paper had no special information about it.

MR. LOCKHART.—I think in a paper read by yourself, you specified how travellers might go into an arid desert by means of relays, bringing supplies with them. What do you think is the distance between the extreme limit of Sturt's Ridge in the south of Australia and the navigable bed of the Victoria?

DR. SHAW.—About 600 miles.

MR. LOCKHART.—I would make one remark with reference to the Chinese

emigrants. I think there has been a great mistake regarding the Chinese emigrants who have gone to Australia. They were represented to me a little time ago by a member of the House of Peers to be rebellious, troublesome, and mutinous, and that at Melbourne the authorities had been compelled to restrict the entrance of the Chinese on account of the trouble they gave. Now, I think, the wants of the Chinese emigrants should be borne in mind. In their own country they are fond of domestic relations. All of them have wives and children, and of all the Asiatics they are the most domestic. When they go to Australia they are left alone, and they are obliged to seek for excitement in gambling and drinking: hence they become troublesome and disorderly persons. When there are so many Chinese emigrants in Australia, some 60,000, I think it would be desirable to offer an inducement to Chinese women to go down there and be married to the emigrants; and also to give a bonus to the Chinese who brought their wives and families with them. I think this would go far to promote quiet and good conduct among the Chinese, and to extend our dominion into the interior.

The CHAIRMAN.—I will crave permission just to make one remark in reply to my esteemed and valued friend Mr. Crawford. He seems in his gallantry, which quality I highly commend, to have attributed to the female sex in India a degree of innocence and gentleness which I do not think they entirely merit. If we have heard of Thugs, we have also heard of Thugnees, who are the female Thugs. Although the humane order of Sir Archdale Wilson preparatory to the storming of Delhi, which we all unite in thinking cannot be too highly applauded, forbade the destruction of women and children, yet there is much cause to believe that the women were in many instances as cruel as the men.*

* With the approval of the President, the following note from the Author of the Paper is given:—

To the Secretary of the Royal Geographical Society.

Brunswick Square, 6th July, 1858.

SIR,—I am sorry that illness prevented my attending the Meeting of the Royal Geographical Society the evening my paper on the "Physical Geography of North-West Australia" was read, as I should have been glad of having an opportunity of replying to some of the remarks of Mr. Crawford.

A country may possess sufficient water without possessing great rivers; and high mountains in the Tropics do not everywhere produce large rivers, as for instance, the Andes of Western Peru send no large rivers to the west coast. Though Tropical Australia possesses no high mountains, it is well watered on its seaward slope. Mr. Crawford makes it appear that wool on sheep would turn to something like hair in the Tropics; but he does not seem to be aware that wool produced in Tropical Australia has already been sent to the English market. This district lies between lat. 18° and 24° south, and in being exposed to the prolonged influence of the sun during the solstice, is as hot as though situated under the Equator. Sheep-farmers in Australia say that they can prevent deterioration (if necessary) by introductions of fine woolled rams from the south.

Wool and gold were not anticipated by the first settlers in Southern Australia, and should not therefore be looked for as an inducement to settle in the North. Cotton, which is equally in demand with wool, may be produced to any required extent, and experiments in its cultivation on the poor soil at Port Essington were highly satisfactory. Mr. Crawford admits that North Australia would produce abundance of oxen, and then asks what would they do with them? The Australian stock-owner would say, "boil them down." And I would add that if boiling down carried on at Moreton Bay pays better than driving the cattle to the gold fields, the same process should pay still better in North Australia: hides, horns, and tallow would also pay well for breeding cattle there. From the spread
of

The second Paper read was—

2. *General Historical View of the State of Human Society in Northern Central Africa.* By PHIL. DR. H. BARTH, F.R.G.S.

THIS paper is a condensed summary of the existing state of knowledge about the whole of Northern Africa, excepting only the Nilotic valley and the Western Coast. It is illustrated by a map, variously shaded and marked with dotted lines, to indicate at a glance the geographical arrangement of its subject matter. Dr. Barth commences with physical geography, and traces the outline and configuration of the Sahara. It is a sandstone or granitic plateau, raised from 1000 to 1400 feet above the sea level, and dotted over with mountainous districts, where rain water is caught by the hills and retained in the valleys, and human habitation rendered possible. These oases are of the utmost importance to the maintenance of great lines of commerce from the Mediterranean to the interior, but in themselves they are unhealthy spots and are hot beds of fever, in proportion to the abundance of their waters.

The available lines of commerce are further marked out by great bands of shifting sand hills, which form an insurmountable barrier to caravans, except at certain known spots. Moisture collects in the troughs between the sand ridges, date palms are found in them, and

of population going on at present in Australia, in ten or fifteen years Tropical Australia will be occupied by English flock-owners to the 12th parallel of latitude; and in less than half that time, if a trading settlement be established on the north coast.

Mr. Crawford doubts my account of the fertility of the soil, because it is represented as a sandstone country. He may on the same grounds doubt the fertility of the counties of Yorkshire, Northumberland, and Durham—in fact any part of England where coal fields exist; but it should have been remembered that the table-land and ranges alone represent the really sandstone country, none of which is included in the estimated 5,000,000 acres of good pasture drained by the Victoria. The wild rice found by me was a different variety from that cultivated by the Malays, and was 300 miles in a straight line from their nearest fishery; that found by Dr. Mueller was 500 miles distant, and on a different water parting; nor am I aware of any rice being found near their fisheries. Besides, Mr. Crawford is in error in saying the fishermen bring their rice with them in the husk. In such case they would require to carry their husking-mills with them, which would be equivalent to our taking thrashing machines, flour-mills, and wheat in the ear, to use on a voyage to Australia. There are many thousands of acres in North Australia better suited for rice, in regard both to soil and water, than some I have seen used for that crop in Timor. If 20 years' experience, principally in the wilds of Australia, be not worth naming, I may indeed be considered a stranger to Australia, to sandstone country, and to fertile soil. Finally it is not necessary that the working people in North Australia should be Chinese or Sepoys. There are many thousand Christianized natives on the islands of Ombay, Kisa, and Rotté, besides people from many other islands, that would gladly move to North Australia for employment, and would settle there with their families.

I am, Sir, &c., &c.,

J. S. WILSON.

a small population exists. There are numerous other regions which are covered with isolated sand hills. Over the whole of the Sahara the temperature ranges between the extraordinarily wide limits of 80° Fahr., between maximum and minimum.

The fertile districts south of the Sahara are by no means so monotonous as they are usually considered to be. Bornu is certainly flat; it is alluvial, like the plain of the Ganges or of the Indus, but the countries on either side of it contain mountains of 5000 or 6000 feet. There is also a vast mountainous region which feeds the sources of the Senegal, Gambia, and Niger, of which we have no positive knowledge.

The population of North Africa appears to have been fed by three streams. One stream from Syria to the far west, and thence thrown back by the Atlantic; another supervening stream, that of the Berber or Tuarick race, also from the East, and afterwards thrown Southwards into the desert, where it still preponderates in excess; and, thirdly, one from Arabia, through Sennaar, that has met the former streams and incorporated itself with them between the 5th and 15th degrees of North latitude. Great stress is laid upon the fact that nearly all the tribes contain two fundamentally distinct races, the black and the red.

A condensed description is given of the intellectual and national characteristics of the great North African races, namely, the Berber, Mandingoe, Fulbe (Fellatah), Hausa, Kanuri (or Bornu), Tebu (Tibboo), Yoruba Nufe, Dahomey and Ashanti, Tombo Mosi, Baghirmi, Wadai, Darfur. The most important of these, in regard to European commerce, are the Berbers, who form a connecting link between numerous and distant races; the Fulbe, because of their importance along the Niger; the Hausa, for their distribution throughout North Central Africa, their liveliness and intelligence; and the Yoruba Nufe, on account of the position of their country by the unhealthy districts of the mouths of the Niger, and for their industry and capacity. Little is known, even by hearsay, of the Pagan nations south of those that are mentioned in the above list. We hear of Banda and of Andoma; Batta is now broken up.

The density of population, in each portion of North Africa, is estimated by Dr. Barth as nearly as his knowledge admits, and is recorded in the map. As a general average, taking the populous kingdoms and their thinly inhabited border districts together, the whole country south of the Sahara is more densely populated than either Marocco or Algeria.

The commercial importance of different districts is next examined, and the great commercial centres of ancient and modern times are

pointed out. Most decided preference is given, on many accounts, to the Niger route over that of the tedious desert caravans.

The religions of North Africa, and the spread of Islamism (originally introduced into Negroland by the Berber race), are, lastly, considered.

DR. WORTHINGTON, F.R.G.S.—I should be glad to be informed by Dr. Barth whether he realised as matter of fact an important point often stated, that the complexion of the black natives materially alters in mountainous countries? And further whether he has any idea as to the general character of the black complexion, and whether when the natives pass from the inter-tropical regions their complexion varies on sojourn correspondently with that of the country into which they move?

DR. BARTH, F.R.G.S.—In some respects I think the level and character of the country have really some influence upon the colour of its inhabitants. We find the *Jolof* settled in the delta of the Senegal and the Gambia, and they are the blackest race of Western Central Africa. We find the *Kanuri*, the very blackest race of those regions, settled round the Chád. The *Jolof* and the *Fulbe* or *Fúlas* are the same race. The *Fúlas*, who in general are the inhabitants of more elevated regions than the *Jolof*, are not so dark as the latter: they are besides also far more slender than the *Jolof*. That certainly may be due to an intermixture with the *Sissilbe* and other tribes. But with regard to Africa, it is very remarkable that tribes settled in low lands have generally a darker complexion than those settled in high lands. Yet as we find this intermixture of blacker and lighter complexion among tribes settled in the same country, I think it is not quite certain that such a difference of colour is in some measure due to the level or any other influence of the region which they inhabit or have inhabited at a former period. In some respects it may be so. In that great amalgamation of various tribes in North Central Africa it is very difficult to say what may have been the original colour of each tribe. However, we find the black-coloured Negro tribe already distinctly represented as the type of a separate race of mankind on the monuments of Egypt.

DR. WORTHINGTON.—I am glad of this explanation, because it shows that colour in a great measure arises from climate. Of course we have varieties. We know perfectly well that the Siah Poosh are white, though amongst dark Hindoos. The *Dendos* are perfectly white, although amongst the black inhabitants of Congo. We have black Jews in Hindostan and in Cochin China, and we have these varieties of the human complexion constantly arising. It would, therefore, seem that complexion is almost an accident dependent on local circumstances—an accident of the position in which a man is placed, and not the result of a colouring membrane only, as it was commonly supposed to be.

MR. CRAWFURD, F.R.G.S.—I differ totally from the gentleman who has spoken, and also from Dr. Barth. I will give you a few examples. African negroes have been settled in various parts of America up to the 30th and 35th degree, even to the 40th degree of latitude, and they are of the same colour, have the same form of features, and are the same people that they were when they were brought from Congo and other countries near the Equator. The native Americans, from Tierra del Fuego up to Hudson Bay, are all red; there is no difference in their complexion. Climate, therefore, elevation or lowness of soil, the level of the Equator or the table land of the Andes, have made no difference in their complexion. I will mention another fact. The Chinese are a yellow coloured people. They are the same complexion at Canton in 22° of latitude that they are at Pekin in the 40th degree of latitude. Whether the land be mountainous or whether it be on the level of the sea, it matters not; the complexion is not altered, nor is the physical form in any degree whatever.

Again, there is the instance I have given of the Spaniards who have been 300 years settled in various parts of America, sometimes on the table land of the Andes, and sometimes upon the very level of the sea, almost on the Equator; they are the same complexion that they were when they quitted Aragon and Andalusia. Then there are the Parsees of Hindostan. They migrated from Persia about one thousand years ago. They have kept themselves free from admixture with the Indians, and they are as fair at this day as when they left the mountains of Persia, although they are settled at Bombay in the 18th degree of latitude. Mention has been made of the Jews who have settled in India. There are two classes of Jews. There are the white Jews, who have kept themselves pure, and who at this day, though settled as far down in Hindostan as the Deccan, in the 18th degree of latitude, are as fair as the Jews in Palestine. But, then, there are what are called black Jews. These are converts, the descendants of people that have mixed with the lowest classes of the Hindoos, and they are properly speaking of the Hindoo race. There is no such thing as a change of complexion on their part. The white Jews are as white as when they left Palestine, and the black Jews are as black as the rest of the Hindoos, of which stock they are composed. The same may be said of the Portuguese. It is said,—See how black the Portuguese have become in India! Not at all. The Portuguese who have kept themselves pure from Indian admixture are as fair as Portuguese in Portugal. Those who usually go under the name of Portuguese are converted Hindoos with Portuguese names. They are of the lowest castes of Hindoos; and very often they are blacker than the ordinary race of Hindoos. Depend upon it neither the form nor the complexion is changed by climate.

DR. WORTHINGTON.—I beg to say that Mr. Crawford is contradicted in that opinion by most of the travellers that I have spoken to on the subject. The Arabs and Jews are justly admitted to be the two nations that never mingle with others. Yet we have black Arabs of the Jordan; and we have black Jews in Hindostan, retaining, in every possible character except the complexion, the Jewish physiognomy; and what is more, retaining records of their race which stamp them to be Jews at the dispersion.

ADDITIONAL NOTICES.

1. *Mémoire sur le Soudan.* Par M. le Comte d'ESCAIRAC DE LAURE. Paris, 1855-6.

THE French conquest of Algeria has eminently directed the attention of French geographers to the exploration of the interior of the African continent, and within the last quarter of a century important additions have certainly been made to our knowledge of that widely extended region. The work before us is a résumé of what is known concerning that part of Central Africa between Lake Chád on the west, and Kordofan on the east, comprising a part of Bornu, the territories of Bagharmi, Wadai, and Darfur, and some others of less consideration; it has been mainly extracted from the 'Bulletin de la Société de Géographie.' It is accompanied by a chart, embracing the countries between lat. 6° and 16° N., and long. 13° 20' and 31° 20' E., and on which the various routes which have been followed by travellers there are laid down. The same chart includes a portion of the course of the White

Nile, and illustrates to a minor extent the expedition of M. Thibaut up that river (to which journey a short notice following these remarks will be found appropriated).

M. de Lauture informs us at the outset (p. 6), that the Sudan is "not more unhealthy than the French possessions in Africa, that its inhabitants are often found very hospitable, and that it is neither difficult to visit it nor to become acquainted with it." Yet in the same page we are apprised that it is only persons who have become acclimated to tropical regions, and are acquainted with the language, customs, and peculiarities of the nations inhabiting them—and especially of those of Arab descent—who are fitted to become explorers of the Sudan. He afterwards dilates upon the difficulties of obtaining previous information, at all approaching to accuracy, relative to the countries which the explorer proposes to visit. As showing how much necessity there is for the traveller to be on his guard against mendacity on the part of pretended guides, he tells a pleasant story (p. 10) of one of these *savans*, professedly a native of the banks of Lake Chád, who, on being asked the route from Sydney to Peking, declared that he knew both places perfectly well, that the former was situated near his native locality, and the latter twelve days' journey westward, the route between the two passing, amongst other places, through Tripoli!

A sketch is given of the hydrography of the region of the Sudan already indicated, which includes notices of Lake Chád, the river Chari flowing into it from the Lake Koei-dabo, near lat. 7° N., the Lake Debaba in Bagharmi, Lake Fitri, the Batha, or chain of marshes which seems to bound Wadai or Bergou on the south, together with the Keilah and Kouan rivers, which, uniting near Lake Nu (lat. $9\frac{1}{2}^{\circ}$, long. 29° , according to the chart), would appear to connect this system of waters with that of the White Nile. The author next treats of the geographical distribution of the animals and the human races inhabiting this region. In his remarks on the former he states that in the territory watered as above described, an animal with a long moveable horn has been rumoured to exist, which he describes as follows:—"This monoceros, called *ab-garu*, that is 'father,' or 'master of the horn,' carries on the forehead a long and straight horn, either striped like Egyptian alabaster, or black. This horn is moveable on a sort of fleshy and erectile peduncle. The *ab-garu* usually suffers it to fall down in front; he straightens it for combat, and tosses his enemy so as to make the latter fall on a smaller horn situated behind the foregoing" (p. 36). This is doubtless the same animal mentioned by the Baron von Müller in his travels in Africa (Journal of the Royal Geographical Society, vol. xx., part 2, p. 283) under the name of the *anasa*, and reported to him to inhabit the country south of Kordofan. The descriptions of the long and pendulous horn in both accounts are singularly consistent, and if confirmed, the unicorn can no longer be considered a fabulous animal. M. de Lauture observes on the report of the Africans respecting it, "I do not guarantee its veracity, but I incline to the belief that the *ab-garu* really exists." A much less probable rumour is that of the existence of a race of men with tails, who have domesticated a race of camels no larger than asses, and who are said to live west of the lake Koei-dabo. According to our author, however, this legend has currency throughout all the African continent.

In the sections which he has devoted to such meagre portions of the history of Central Africa as he has been able to collect, M. de Lauture gives lists of successive sovereigns of the Fellatahs, of Bornu, Kanem, Mandara, Kotoko, Bagharmi, Fitri, Medogo, Wadai, and Darfur; but it is to be regretted that no corresponding dates can be, or at any rate are, placed against their names, so as to indicate their contemporaries in the history of the civilized world. Lists of itineraries, and accounts of the domestic industry, institutions, dis-

inctive marks, political intercourse, warlike arts, religion, and superstitions of the nations of the Sudan, occupy the remainder of the treatise, which is worthy of perusal.

2. *Expédition à la Recherche des Sources du Nil (1839-40). Journal de M. THIBAUT, publié par les soins de M. le Comte d'ESCAÿRAC de LAUTURE.*

THIS is a narrative of a companion of M. d'Arnaud, who, under the auspices of Mehemet Ali, made several expeditions up the White Nile, which he ascended as high as lat. $4^{\circ} 42'$ N. The journal of M. d'Arnaud was published in the 'Bulletin de la Société de Géographie' in 1842. M. Thibaut accompanied that explorer in his first expedition as far up the White Nile as lat. $6^{\circ} 33'$, in the winter of 1839-40.

On their leaving Khartum, Mehemet Ali, the ruler of Egypt, assembled the members of the expedition in the grand divan of the Governor of Nubia, and thus addressed them in giving his parting instructions:—"I do not enter into those countries as a conqueror; be prudent; make presents worthy of me; acquire the good will of the savage people, whom, no doubt, you will meet with in great number; obtain their friendship by benefits. The troops which attend you are only for your protection, and not for attack." This oration, delivered "with that amenity which distinguished him," was truly paternal. It will be hereafter seen how the instructions of the Pasha were carried out. The expedition consisted, besides the special officers, of 400 infantry soldiers, under the command of an adjutant-major and a certain Soliman Cachef, and was conveyed in five gun-boats and five other boats, accompanied by fifteen river transports, carrying provisions for eight months, and munitions of war. It left Khartum on Nov. 16, and in the journal of M. Thibaut, under the date of the 18th, we find the following description:—"The White Nile is not dangerous from sandbanks, as is the Blue Nile; its course is interspersed with numerous islands, which increase in number on proceeding southward. It is of pretty equal depth, but during the season of low water its navigation is difficult, from shell-banks and fallen trees which encumber its bed." The banks on both sides are described as in most parts fertile and well-wooded.

The memoir is unaccompanied by any map. No barometrical, and very few thermometrical observations are recorded; nor are the latitudes and longitudes given of any of the places mentioned. These are disadvantages which very much detract from the value of the narrative as a geographical record. The descriptions of the countries traversed are, however, by no means destitute of interest. On arriving at Lake Nu (which is laid down in the chart attached to the work previously noticed), where several rivers disembogue, the expedition took the wrong track, and ascended a river which was found to be impassable for the flotilla, owing to a vast depth of mud. Ultimately the vessels retraced their course, a distance of 45 miles, and at length rediscovered the main stream of the White Nile, which, above Lake Nu, comes from the south-east.

The Egyptian troops appear soon afterwards, from the details given, to have become ungovernable by their officers; and the latter were imposed upon by a lying or suspicious dragoman. Amongst other exploits, on the 4th of January, whilst in the country of the Kyks, and after a supply of oxen had been afforded to the expedition by the natives, a crowd of the latter assembled on the banks of the river, either attracted by curiosity, or desirous to exchange their weapons and bracelets for glass beads and other ornaments, "when the dragoman, or interpreter, gave notice that the natives opposed the passage.

This, *before it was ascertained to be well founded*, was a signal for massacre. The advanced guard fired; few victims fell, but the people took to flight through the tall grass which concealed them. The soldiery, furious, hastened pell-mell out of the barks; and deaf to recall, pursued the blacks. Some officers followed them, but could not restrain their eagerness. Those of the Sudan were especially violent: many blacks fell before their attack." Again on the 6th, "A hundred blacks, amongst whom were women, showed themselves at a distance watching us; some were dancing, others carried arrows and lances. Our dragoman assured us that they had ill intentions; this was a signal for attack. A sub-officer commanding thirty men ordered them to fire; one black fell, the rest took to flight, and our troops put themselves in line of battle to the sound of the drum. . . . This expedition was terrible; many of the natives, unable to save themselves, fell victims. A lake into which many of these unfortunates threw themselves was strewn with dead bodies. Our men returned *glorieux!* driving before them some young calves, &c. It was an absurd folly to desire to punish these people, who, doubtless, *had no idea of injuring us. The dragoman had done it all.*" By such manifestations as these, the Egyptians hoped to open a commerce with the interior! Such commerce, however, if it could be established, could not fail to be profitable. In one decayed village the author observed that elephants' teeth were picketed in the ground to form pens for cattle, and had been used in the construction of cabins and outhouses.

The expedition arrived at Khartum, on its return, March 29, 1840, after an absence of four months and a half. On the 26th of January the boats had reached a point beyond which the diminished depth of water at that season would not permit them to advance. M. Thibaut records at full length a speech of his own (p. 81) in a council of deliberation held on the subject, which he says materially influenced the decision for an immediate return.

3. *Biblical Researches in Palestine and the adjacent Regions: a Journal of Travels in the Years 1838 and 1852.* By EDWARD ROBINSON, ELI SMITH, and others. Drawn up by Professor E. ROBINSON, D.D., Gold Medallist R.G.S., etc. Second edition, with new Maps and Plans. Murray.

FOUR handsome volumes, under the above title, have recently been added to the library of the Society. The former edition, for which it will be recollected the Society awarded to its author a gold medal in 1842, was in three volumes. These, as Professor Robinson announces, have in the present edition been compressed into two volumes, partly by a change of type and partly by the omission of portions of the former appendix and notes, whilst the text remains for the most part unchanged. The third volume of the present edition consists of the additional researches of the author and his fellow-travellers in the same region in 1852; and the fourth of the volumes, to which we have alluded, is merely a duplicate of the third in the second edition, and is published in a separate form, to render complete the series belonging to the possessors of the first edition.

The journeys of Professor Robinson, as detailed in the volumes published in 1841, were first through central Europe to portions of Greece and Egypt—then from Cairo to Suez—to Mount Sinai—to Akabah—to Jerusalem and through its neighbourhood, after descriptions of the topography, antiquities, history, statistics, &c., of that city—from Jerusalem (N.) to Bethel—to 'Ain Jidy, the Dead Sea, Jordan, &c.—from Jerusalem (S.W. and S.) to Gaza and Hebron—from Hebron (S.S.E.) to Wady Musa and Petra—from Hebron to Ramleh and

Jerusalem—then to Nazareth and Mount Tabor—by the Lake of Tiberias (N.) to Safed—from Safed (N.W. and N.) by Tyre and Sidon to Beirut—and thence homeward by way of Smyrna, Alexandria, Constantinople, and Vienna.

In his preface to the present edition Professor Robinson states: "The corrections and additions to the original work are few, but not unimportant. Notes have been added at the end of vol. 1 on the position of Israel at Sinai, on Jebel Serbâl, and on the Sinaitic inscriptions. Ancient *Geba* is now identified with *Jeba*'; *Gibeah* of Benjamin is recognised at Tuleil-el-Fûl; while *Ophrah*, *Ephron*, and *Ephraim*, as being probably one and the same, are fixed at Tayibeh. The historical evidence is also given of the identity of *Eleutheropolis* with Beit-Jibrin; and a new marginal note enumerates the reasons for not seeking *Kadesh-barnea* in the high western desert." With this information, then, may be dismissed in this place the first two volumes of the new edition, which, as the author with just gratification and absolute truth remarks, "have been permitted to take rank as a standard work in relation to the Holy Land."

Of the contents of the third volume, an abstract appears in the twenty-fourth volume of our Journal (1854), accompanied by a map, upon which the route travelled over is very distinctly laid down. This is a great advantage in maps and plans intended to indicate the proceedings of travellers. The maps belonging to the present edition of Professor Robinson's work are by Kiepert, of Berlin. Although most elaborately drawn and beautifully executed, especially as regards the physical geography, they are somewhat too crowded to exhibit clearly on their comparatively limited scale the names of places and the route which the author pursued. Starting from Beirut, where his previous researches had terminated, Professor Robinson in this, his second tour, went southward along the coast to Sidon; thence, striking inland through Galilee to 'Akka (Acre), he visited in this route Tibnin, Rameh, Meiron, &c., at all of which places striking remains of antiquity are to be found. Of 'Akka the author gives an extended description and historical notice. Thence he continued, still for the most part southward, through Galilee and Samaria to Jerusalem, by way of Kana (Cana of Galilee), Seffurieh, across the Plain of Esdraelon, and along the eastern side of Mount Carmel, to Nablus (Nablous). In this part of his work some curious details respecting the Samaritan population and their ancient books are added to what the author had stated in a previous volume. Lydda, Yalo (Ajalon), and 'Amwas (Emmaus), lay in this portion of the journey. More than a hundred pages are occupied with highly interesting observations made at Jerusalem, in the course of which many important points in topography and archæology are determined, or brought under review. From the Holy City excursions were made on the west and south; in the latter direction as far as Hebron. Leaving Jerusalem on the north for Beisan (Beth-shean, or *Scythopolis*), the travellers took in their way Akrah, Nablus a second time, Tubas (the *Thebez* of Scripture), a portion of the "Ghor," or valley of the Jordan, and Sakut, which, in the opinion of Professor Robinson, after a consideration of various authorities, "represents the name and site of the ancient Succoth." Before reaching Beisan the party forded the Jordan, in order to visit on its east side the ruin ed-Deir, probably the *Jabeth-Gilead* of Scripture, and also Fahl, which the writer has been the first to identify by observation * with Pella, whither the Christians of Jerusalem withdrew previous to the destruction of that city by Titus.

* Professor Robinson states (iii. 323) that Irby and Mangles were the discoverers of the ruins here, but that no Frank traveller had since visited the spot. Kiepert had already proposed to insert the name Pella in the maps, before the second journey of our author. The latter adds, "It was not done, however; because I desired that the maps should contain nothing which had not been actually verified: but in Kiepert's own later map, published in 1842, Pella was thus inserted for the first time, with a query."

“Scythopolis must have been a city of temples.” The traces of several, of an amphitheatre built of black stones, a fine Roman arch thrown over the chasm of the Jâlûd, and remains of thick walls here, are described by Professor Robinson, who also gives a sketch of the history of the city from the period when the bodies of Saul and his three sons, slain on the adjacent mountains of Gilboa, were fastened by the Philistines on its wall (1 Samuel, xxxi. 10; 2 Samuel, xxi. 12). From Beisan the researches were continued northward through Galilee, and to Hasbeiya near the head-streams of the river Jordan. In the course of this journey Mount Tabor was passed on its eastern, and the Lakes of Tiberias and Huleh on their western sides. Irbid, the *Arbela* of Josephus, where are some remarkable caverns, Tell-Khuraibeh, which our author regards as the Hazor taken by Tiglath-Pileser, and Kedes (*Kedesh*), lay in this part of the route. But by far the most interesting portion of this section is the identification of the sites of Capernaum, Bethsaida, and Chorazin on the western shore of the Lake of Tiberias, which Professor Robinson, after a comparison of the statements of authorities, from the seventh to the seventeenth centuries of our era, aided by his own inspection of the localities, considers that he has satisfactorily made out (pp. 347-361).

The ninth of the sections, into which the volume is subdivided, embraces a circuitous tour from Hasbeiya to Baniyas (*Paneas*) and back again, partly on the eastern side of the head-streams of the Jordan, and extending southward nearly to Lake Huleh. In the course of this journey Khiyam, Tell-el-Kady, the ancient city of Dan, the lake Phiala, the sources of the Jordan, and Hibbariyeh, where is a fine ruin of an ancient temple, were progressively visited. From this point (Hasbeiya) the researches extend into a region entirely untrodden in the journeys to which the previous volumes before us have reference. The travellers went eastward, across Mount Hermon, to Damascus, “the oldest city in the world.” Throughout all this route the remains of antiquity are numerous: many of these are described, and to Damascus and its history twenty-five pages are allotted. After excursions in the neighbourhood of this city, we find Professor Robinson and his companions, having recrossed Anti-Libanus, proceeding northward to Ba'albek; in the course of which journey records are made of Roman inscriptions and sepulchres in the valley of the Barada, of the remains of Abila, Mejdél with an ancient temple, and 'Anjar (probably the *Chalcis* under Lebanon). To Ba'albek, which has been repeatedly described in the books of other travellers, considerable space is devoted, accompanied by some plans of its vast and interesting temples, which have been so singularly passed over in the narrations of ancient writers. From Ba'albek the route of Dr. Robinson and his fellow-travellers extended through the Buka'a, or Cœlo-Syria, as far as El Husn, passing in the way er Râs (probably the ancient *Conna*), the head-streams of the Orontes, and Ribleh (the *Riblah* of Scripture). Incidentally to the details of this journey, geographical remarks on Lebanon and Anti-Lebanon, and notices of some places not visited, as Apamea, Larissa, Hamath (Hamah), Arethusa, Emesa (Hums), and Laodicea of Syria, are appended. Finally, in the circuitous route south-westward, taken again to Beirut, the great convent Mar Jirjis (St. George), el-Humeira, with its intermitting fountain, the subject of a curious legend (pp. 572-3); 'Arka, an ancient Phœnician city; the remains of the temple of Afka (*Apheca*), with the sources of the river Adonis; the large temple at Fukra; the pass of Nahr-el-Kelb (ancient *Lycus*), where is a curious collection of Egyptian and Assyrian antiquities, side by side; and the cedars of Lebanon receive notice. We greatly regret that we cannot find space for the description of the last named, of which an account will be found at pp. 588-594.

For some detached particulars scattered through the third volume, however, room must be spared. We learn, at p. 32, that “the Turkish government has wisely continued and extended the system of posts introduced into Syria during

the Egyptian dominion. At present (1852) a post travels every week to and fro between Beirut and Jerusalem, by way of Yâfa; another passes northwards weekly to Tripoli and Lâdakiyeh, and thence to Aleppo. The communication with Damascus (from Beirut) is twice a week. From Aleppo and Aintab a land post goes regularly through Asia Minor, both to Constantinople and Smyrna. The transmission of letters on all these routes is tolerably rapid, and not expensive." At Beirut there existed in the same year a *native* "Society of Arts and Sciences," which had been founded in 1847, a part of its members having been educated in the American mission at that town. The Society met twice in a month, when papers were read, questions discussed, and occasionally lectures delivered; and in the first year of its existence 750 volumes had been collected for a library, amongst which were 527 Arabic and Turkish manuscripts, some of them dating back seven or eight centuries. Professor Robinson attended some of the meetings, and remarks, "With one exception the speakers were *all natives*, and I have heard much worse speaking before Literary Societies in London and New York" (p. 27). Such a circumstance is one of better omen for the progressive advancement of the countries under Turkish rule, than any mere political events could afford.

In reference to Lejjûn, the ancient *Legio*, the author reminds the reader that in a former volume he had set forth the grounds for assuming the identity of Legio with the more ancient *Megiddo* of the Old Testament. He adds, "Our visit only strengthened this conviction" (p. 118). In his criticism relative to the rock-hewn tomb beneath the church of the Holy Sepulchre at Jerusalem, Professor Robinson gives his reasons for not referring its formation to even so early an age as that of Constantine—and, in fact, all his researches in that city attest the difficulty of identifying the correctness of sites to which specific names have been applied in accordance with monkish traditions. With respect to the antiquity of the arch in masonry, he asserts that "it was well known in the East long before the period of the Jewish exile, and at least seven or eight centuries before the time of Herod" (p. 229).

At Urtas, near Hebron, the author fell in with seven or eight Americans, men and women, who had come out as missionaries to introduce agriculture among the Jews, but being unacquainted with the language and customs of the country, and therefore helpless, they had been taken by Meshullam, a convert from Judaism, into his employ, where they found at least food and shelter. They had brought out with them some American ploughs, but could make no use of them for want of stronger teams. A similar colony of Germans had been in like manner employed by Meshullam two years before, but they, too, had become dissatisfied, and dispersed (p. 274). Professor Robinson says, "It is hardly necessary to remark that the idea of speedily converting the Jews, living as strangers in Palestine, into an agricultural people, is altogether visionary." Mere enthusiasm in any object, unsupported by sufficient knowledge to enable its being properly carried out, can be expected to result in nothing but lamentable failure.

In recording the arrangements made by himself and his companions previous to entering upon their tour, Dr. Robinson remarks (p. 31), "that the most usual mode of travelling in Syria is for a party to put themselves under the charge of a dragoman—a native who speaks more or less of English, French, or Italian—and who undertakes to provide them with sustenance, servants, tents, bedding, and means of transit." The party found the expenses of travelling comparatively less on this journey than on the preceding one under the Egyptian rule; they amounted to somewhat less than 1*l.* each daily. It is stated that the travellers took with them no weapons whatever, and never for a moment felt the need of any. Each had a Schmalkalder's compass, measuring tapes, and thermometers. Besides the books enumerated in his former work, Professor Robinson took with him the first two parts of Ritter's great work on Palestine, the sheets of the

third part as far as to the description of 'Akka, and the latest and best maps of the region, including the large route map of the Dead Sea expedition. At the commencement of his third volume he gives us a very complete list of standard or popular works on Palestine, Jerusalem, &c., with highly useful remarks on their comparative trustworthiness and value.

As a dedication, although placed at the commencement of a book, is commonly the portion of it which is the last to be penned, it is quite legitimate for a commentator, like an author, to postpone its consideration to the end of his labours. A name may be inscribed on the front page of a work as a matter of form, or in deference to some exalted personage; but it is more appropriately that of an authority from whose learning, researches, or other aid, the author has derived signal advantage. The first two volumes of the present edition were originally inscribed to Lord Prudhoe, whose investigations, carried on in Egypt and the adjacent countries to which those volumes relate, prove that his Lordship is entitled to such a recognition not solely on account of his distinguished rank. The third volume has been dedicated by Professor Robinson "To William Martin Leake, Esq., the model traveller." Assuredly the acuteness, care, and learning displayed by Col. Leake, in his published works on classic regions, could not fail to be recognised by a practical investigator of the stamp of Professor Robinson, who has thus worthily testified his admiration of the abilities and acquirements of our learned *confrère*; and the testimony accorded by this dedication is honourable alike to the discrimination of him who gives it, and to him by whom it is received.

4. *Hutchinson's Western Africa.* Longman and Co., 1858.

MR. HUTCHINSON has resided for eight years in Western Africa, and was the officer in medical charge of the *Pleiad's* crew during Dr. Baikie's expedition up the Tsadda in 1854. During the last two years he has occupied his present position of British Consul for the Bight of Biafra and Fernando Po, in which districts his acquaintance with the African coast first commenced.

The former part of his volume is occupied with cursory remarks on the numerous settlements in West Africa, from Portandick down to Palma, but more copious information is afforded as to the scenes of his present duties. The chapters on Fernando Po will be of great interest to those who shared in the opinion entertained by the late Sir T. F. Buxton and others, that the geographical position of this lofty island marked it out as a most important station whence European influence might act upon the civilization of Western Africa. The account given by Mr. Hutchinson of the whole history of our connection with this island is the only one that has yet been published, so far as the writer of the present notice is aware, and it is to the following effect.

Fernando Po was discovered by the Portuguese in 1471, ceded, for some equivalent, to Spain in 1778, together with the neighbouring island of Anno Bon, and in the same year taken possession of by her by means of a large expedition which contained 150 intended settlers. But the fate of this expedition was disastrous: the old Portuguese settlers at Anno Bon considered the new comers as intruders, and resisted and repulsed them. They then settled at Fernando Po, but in three years the climate had carried off 128 out of the 150, and the survivors were then recalled to Spain, and from that date until 1843 "the Spanish Government seems to have blotted Fernando Po out of their maps."

In 1827 the English Government was induced to establish a colony on this island. The settlement was commenced by Captain Owen. The ground was formally taken possession of in the presence and with the permission of two

native chiefs, from whom it was bought for a trifle, and Europeans were forthwith set to work, in the blazing sun, to dig and clear the ground and to raise mounds for guns. A fearful mortality ensued, which would not have been the case had Krumen been employed, whose services are always easily to be obtained, and the settlement prospered poorly. Into the causes of its ill success Mr. Hutchinson does not enter.

In 1833 Admiral Warren came out in the *Iris*, and disclaimed, on the part of the Government, their intention of keeping up the settlement any longer.

From 1833 to 1837 the island remained in the hands of a private company, Dillon, Tennant, and Co., on whose failure in 1837 the West African Company became possessors of the stores, and they sold them to the Baptist Missionary Society in 1841 for 1500*l*.

In 1843 Spain resumed possession; the Spanish flag was hoisted there, as well as at Corisco and Anno Bon, and Mr. Beecroft was made Spanish governor of these three islands. In 1845 another expedition was sent, which left behind two priests and a few soldiers: the soldiers soon died, and the priests left the island.

In the meantime the British Government, recognising the importance of its commercial interests in the Bights of Benin and Biafra, established a consulate, and Mr. Beecroft was appointed consul. His situation as Spanish governor did not interfere with this, as it was a mere nominal title, without any Spanish interests whatever for him to superintend; and at the death of Mr. Beecroft in 1854, he was succeeded by Governor Lynslager, a Dane.

At the time of the arrival of a body of Spanish missionaries in 1856 not a single Spaniard was resident in the island.

Since the foundation of Clarence, British cruisers have landed negroes from many captured slavers, and in March, 1856, the census of the population was as follows:—

Englishmen	7
Other British residents	98
Liberated negroes	238
Children of old settlers, and others who consider themselves British subjects ..	222
Other negroes, working as artisans and servants	416
Total	981

Fernando Po, though rising to 10,000 feet above the sea, is wooded to its very summit, and teems with indigenous products, but it is uninhabited except to a very low level. Mr. Hutchinson corroborates the opinion of Lander that Clarence is not the best place for a settlement, but that St. George's Bay offers a much better harbour, and that the high land on the top, Cape Badgely, would be as healthy for an European settlement as any place in a tropical island can be, since it is probably above the fever level and is fully exposed to the westerly breeze.

There has always been a difficulty about the ethnological group to which the natives of Fernando Po belong. Mr. Hutchinson describes them as perfect negroes, and decidedly without any of those Caucasian features ascribed to the Guanches, the indigenous population of the Canaries. He finds especial fault with the two likenesses of Fernandians published in Lieutenant-Colonel Smith's work on the Natural History of the Human Species. They are utterly unlike Fernandians, either in colour or in form of feature. A long list of their ceremonies is given with a view to their identification with other tribes. Their burials are very peculiar, for their dead are buried upright, with the

bodies half out of the ground, and the family emigrates to another town. Their fetish is a snake.

Considerable space is devoted to the preventives and treatment of African fever. Mr. Hutchinson especially insists on flannel next the skin, quinine in small daily doses to keep off the fever, and, in river expeditions, avoidance of stowage of green wood in the bunkers. A recommendation of Admiral Bruce, some years since, is published as thoroughly falling in with his views, viz., that a regulation ought to be established, by which the masters of merchant-vessels anchored for the purposes of trade up the African rivers should, during the first month after crossing the bar, serve out quinine wine to their crews in the place of lime-juice, which is in no way needed on account of the superabundance of vegetable produce.

As regards the development of commerce in Africa, he considers that Lagos cannot ever become an exporting place of importance on account of its dangerous bar and fearful surf,—impediments which are absent at the mouths of the Niger (Nun), Bonny, Old Calabar, and Cameroons Rivers.—F. G.

5. Report of the Ordnance Survey of the United Kingdom. Ordered by the House of Commons to be printed, 30th June, 1857.

THIS Report of Lieutenant-Colonel James, R.E., F.R.G.S., contains in a few pages a very complete and interesting account of the way in which the maps of the Ordnance Survey are drawn, reduced, and engraved at head-quarters in Southampton.

The Report refers to the state of the arrangements last year, immediately preceding a vote in the House of Commons, on the motion of Sir D. Norreys, by which a reduction was ordered in the scale upon which the survey of the country was then being carried on, and consequently a part of Colonel James's contrivances fell into disuse.

At that date the Ordnance Survey was occupied, 1st. In making a survey and a MS. plan of all England and Scotland, excepting only the uncultivated districts, on the scale of 25 inches to a mile (or, what is very nearly the same thing, a square inch to an acre).

2ndly. In reducing these to a scale of 6 inches to a mile, and engraving and publishing them, and likewise in surveying, publishing, and engraving the uncultivated districts to the same 6-inch scale.

3rdly. In making a further reduction of the above to a scale of 1 inch to the mile, in order to complete as rapidly as possible the still unfinished general map of Great Britain.

Lieutenant-Colonel James's Report shows the contrivances adopted by him to economise labour in all these steps, and 28 pages are devoted to illustrate the effects of his contrivances.

In drawing the original plans, stamps and stencil plates are used for the figures, letters, trees, and various kinds of shading; and in engraving the 6-inch scale plates, punches are used for the same purposes, and mechanical means are adopted to give the shading. Evenness of work is thus obtained, together with a great economy of skilled labour, while the examples adduced are in no way to be charged with stiffness of execution. For publishing copies of the large-scale plans, zincography is used: it was found far more convenient than lithography; the prints were equally sharp, and decidedly darker. When the necessary copies had been printed off, and the plate had been recleaned, it was always possible, at any future time, to form a fresh zincograph from one of the old impressions by using the anastatic process. Examples of all these are given; and the cost of these publications is so small, that a copy of the MS.

plan or of a printed one may be transferred to the zinc, and 50 impressions taken off for 50 shillings.

It was a matter of great importance to find a ready way of reducing drawings from a larger scale to a smaller one, and after many experiments photography was found to fully supply the requirements of the office. By its means, and without sensible distortion, one man is literally able to do the work of 100 skilled draughtsmen; thus, a single individual, with the aid of a printer and a labourer, produced in 6 days 12 square feet of photographic reductions, besides 135 impressions in all from photographic positives that had already been prepared. One of these reductions is given to the engraver to work from, another to the officer who inserts the contours, and so on, and by this arrangement everything proceeds *pari passu*.

Experiments were made to ascertain the relative powers of the different colours for producing photographic tints, and the following scale of colours was found to produce a scale of shades from nearly perfect white to jet black: *blue, purple, red, orange, yellow*. All the streets and houses in the plans are coloured yellow, and appear as jet black in the reductions. The hill shading on the 6-inch maps is similarly done with bold yellow strokes, the artist guiding his touch by the fine contour lines or the levels which are engraved upon them. When these are reduced to the 1-inch scale, the contour lines, &c., become quite invisible, and the hill shading stands out in dark relief. Most beautiful specimens are given of these photographic reductions.

Lastly. When the plates have been engraved it is found expedient never to use them for printing, but to keep them as permanent references, and to prepare any required number of electrotype duplicates from them. This art of electrotyping is here carried on, as Colonel James considers it, to perfection. There is no loss of sharpness in the duplicates, additions and alterations can be made without tampering with the original plate, and there is no fear of a gradual deterioration in future impressions.

The effect of the vote of the House of Commons, June, 1857, has been to cause the discontinuance of the surveys on the large scale, and at present the rural districts are being surveyed and drawn on the same 6-inch scale on which they are engraved, and afterwards they are reduced by photography and engraved on the 1-inch scale.—F. G.

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1858.

Thirteenth Meeting (ANNIVERSARY), 1 P.M., *May 24th*, 1858.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

THE Minutes of the previous Meeting having been read and confirmed, the regulations respecting the Anniversary Meetings were next read, when the President appointed William Bollaert and John Brown, Esqrs., Scrutineers for the Ballot.

The Rev. H. Lewis, T. J. De Bourgho, Edward David Ogilvie, William Nicholas Reed, Samuel Leigh Sotheby, and William Reynolds Vines, Esqrs., were proposed as Candidates for election at the next Meeting.

The Report of the Council, with the Balance Sheet for 1857 and the Estimate for 1858, was then read and adopted.

The President next delivered the Patron's or Victoria Gold Medal to His Excellency the Hon. G. M. Dallas, the American Minister, on behalf of Professor Alexander Dallas Bache, Superintendent of the United States Coast Survey, for his extensive surveys of America, and for the additions made by him to our knowledge of Geography and Hydrography.

The Founder's Gold Medal was delivered to Captain Richard Collinson, R.N., C.B., for his discoveries in the Arctic Regions, and for having, in H. M. S. *Enterprise*, penetrated farther to the Eastward, through Behring Strait, than had been reached by any other vessel.

The President then read his Anniversary Address, for which a unanimous Vote of Thanks was passed, with a request that he would allow it to be printed.

The Ballot being concluded, the Scrutineers reported that the changes advised by the Council had been adopted. The vacancy among the Vice-Presidents, occasioned by the retirement of Sir Walter C. Trevelyan, Bart., to be supplied by Captain Richard

Collinson, R.N.; that among the Trustees caused by the resignation of W. R. Hamilton, Esq., to be occupied by Richard Monckton Milnes, Esq., M.P.; and those in the Ordinary Councilors, produced by the retirement of the Rt. Hon. W. E. Cardwell, M.P.; Capt. R. Collinson, R.N.; R. Monckton Milnes, Esq., M.P.; Lieut.-General Sir G. Pollock, G.C.B.; Henry Raper, Esq., R.N.; Capt. J. Lort Stokes, R.N.; and Sir Harry C. Verney, Bart., M.P.; to be filled by Lord Dufferin; W. J. Hamilton, Esq.; Lieut.-Colonel H. James, R.E.; Capt. the Hon. H. A. Murray, R.N.; the Earl of Sheffield; Colonel Thomas M. Steele, and Robert Stephenson, Esq., M.P.

Thanks having been voted to the President, Vice-Presidents, Members of the Council, Auditors, and Scrutineers, the President finally directed attention to the usual Anniversary Dinner, and the Meeting adjourned at 4 P.M.

PRESENTATION
OF THE
ROYAL AWARDS

TO

PROFESSOR ALEXANDER DALLAS BACHE, OF THE UNITED STATES; AND CAPTAIN COLLINSON, R.N., THE ARCTIC EXPLORER.

THE President read the following statements explanatory of the grounds on which the Council had awarded the Royal Medals respectively:—

The Victoria or Patron's Medal has been adjudicated to Professor Alexander Dallas Bache for his successful labours in carrying out the Great Coast Survey of the United States of America. This noble work owes its origin, we believe, to the suggestion of those enlightened statesmen Jefferson and Gallatin, as early as 1807, and was supported in 1809 by the American Philosophical Society, when Mr. Hassler, an eminent geometer of Switzerland, then resident in the United States, was entrusted with its execution. But war, and the time required for the manufacture of the instruments, delayed the commencement of the work till 1816. Continuing the Survey, with a brief interruption, to 1844, Mr. Hassler was then succeeded by our Medallist.

Operations of this nature will, of course, have been made available for a correct delineation of all the surface of the interior; for it is manifest that every triangle referable to a known unit furnishes three decided bases with which others may be connected in any direction, as long as there remains a *terra firma* for the instruments to stand on; but these internal operations being more of a domestic nature, do not appear to the Council to establish any distinct claim to the Medal. The case, however, is very different when we come to consider the accurate delineation of such a coast as that of the United States, commencing at the State of Maine, comprising no less than eighteen states on the Atlantic and Gulf of Mexico,

besides others on the Pacific, and extending, as we are credibly informed, over not less than 30,000 miles. This number, no doubt, includes all the windings and indentations of the coast, and the interiors of its harbours, the islands, &c.; for it is to be remarked that, by the especial provision of the Government of America, the duty is not confined to one class of persons, but is shared equally by military and naval men and civilians, all chosen for their fitness, whereby not only is the field for selection vastly expanded, but a greater facility of correctly taking soundings and delineating shoals, harbours, and isolated rocks, is afforded.

It would be impossible to do justice to an extensive work of this sort on an occasion like the present; but as the previous Reports of this celebrated Coast Survey from 1844 to 1855, inclusive, are in our Library, those of our Associates, and of the public generally, who wish to form an estimate of their value, can do so at their leisure, and they will see how vastly our Medallist has pushed on this great work. They will assuredly then rise from the examination with the thorough conviction that, whether we regard the science, skill, and zeal of the operators, the perfection of their instruments, the able manner in which the superintendent has enlisted all modern improvements into his service, the care taken to have the observations accurately registered, his modest and unpretending demeanour, or the noble liberality of the Government, tempered with prudent economy, all unprejudiced persons must agree that the Trigonometrical Survey of the United States of America stands without a superior.

What then are we to say respecting the accurate delineation of this immense tract of coast, so much frequented by commerce, so important in every point of view to mankind at large, but that it is a great and universal boon conferred on all the inhabitants of this globe? We all benefit by the security of navigation; it is not the Government of the United States of America alone which derives an exclusive advantage from this admirable series of operations, but those who have most frequent access to the shores of the Atlantic and Pacific chiefly participate therein; and as Great Britain stands foremost amongst these, on whom can we so deservedly bestow one of our two Royal Gold Medals this year?

The President then addressed his Excellency the American Minister in these words:—

“Mr. Dallas,—Whilst I can truly say that the Council and myself rejoice in this opportunity of recording our sense of the high merits

of Professor Bache, I have a peculiar satisfaction in being permitted to place the Victoria Medal of the Royal Geographical Society in the hands of your Excellency, with the request that you will convey it to your eminent relative.

"The grounds for making the award of the highest distinction which it is in our power to confer, have been expressed in the terms sanctioned by the Council; but that document does not allude to other great qualities of a man who, besides his admirable Coast Survey, has so largely extended our knowledge on various subjects of scientific importance. I may here cite his delineation of the iso-magnetic curves both in Europe and America, his littoral and deep-sea soundings, which, it is believed, will soon enable us to read off the natural history of the Gulf Stream, and to calculate the periodicity and perturbations of the tides at given spots, and his many ingenious inventions, including a method of registering the pulsations of distant earthquakes.

"British philosophers, Sir, have indeed long admired the progress of your accomplished relative, as I can personally testify; for when he visited our country, in 1847, I had the gratification, on resigning the chair of the British Association to my esteemed friend Sir Robert Inglis, to welcome Mr. Bache to our meeting at Oxford, where he presented to us some results of his great Survey, and we did honour to ourselves by enrolling him among our honorary members.

"Lastly, Sir, when I know how successfully he has recently been labouring to aid the accomplishment of the submarine electric telegraph which is to unite our countries—that this same individual is the great-grandson of the illustrious Benjamin Franklin, as well as the near relative of one of your leading statesmen, and that, bearing his honoured name, he is your own nephew, I feel, in common with my Associates, that there never was an occasion on which the sympathies and just pride of our kindred nations were more thoroughly united, than they are by the adjudication of the Victoria Gold Medal to Alexander Dallas Bache."

The American Minister thus replied:—

"Mr. President,—I receive with much gratification, on behalf of my eminent fellow-citizen, Professor Alexander D. Bache, this mark of the approbation of your learned Society.

"The fame of her sons in the noble brotherhood of science is a most cherished part of my country's wealth and strength; and, as her national representative, I thank you, Gentlemen, for thus adding to her store.

"Professor Bache has for many years discharged elevated, interesting, and arduous duties under the Government of the United States. He was specially fitted for these by academical training and successes, by educational labours, by an intellect at once lucid, profound, and persevering, and by an aptitude, not too common with reserved students and philosophers, for practical method and administration. Without adverting to a rich series of prior and of

accessory performances, I speak with entire certainty in saying that his chief work (though yet uncompleted), the Survey of the American Coasts, Sounds, and Estuaries, in all their expansion, intricacies, and characteristics, admirably delineated, as if daguerreotyped, in charts of extraordinary perfection, has earned for him a solid and enduring reputation in this, as in our own, hemisphere.

“I believe him, Sir, in every respect entitled to the high honour you confer by awarding this Medal, and am happy in being made by your distinguished Association the medium of its safe transmission.”

The Founder's or King William's Medal has been decerned to Captain Richard Collinson, R.N., C.B., &c., &c., for having in Her Majesty's ship *Enterprise*, though baffled by provoking calms and adverse winds, ultimately passed through Behring Straits in search of Sir John Franklin and his companions. Hampered by those glacial obstructions which every change of wind wafted against him, and greatly perplexed by the proofs occasionally found of his former companion, M'Clure, being in advance, but without the slightest intimation of the course he had pursued, Captain Collinson deemed it advisable to follow the open water in shore, and thus penetrated farther to the eastward than any vessel had ever reached, approaching nearly to the point attained by the *Hekla* from the Atlantic in 1819.

Though employed on a mission of pure humanity, Captain Collinson was quite alive to the benefit commerce might derive from taking advantage of the now discovered resort of shoals of huge whales, seen from time to time disporting themselves in unvisited security; and, therefore, this voyage has also the merit of extending the field of that profitable fishery in the Arctic Seas.

Captain Collinson's previous services as a surveyor (and he was with our late lamented President Admiral Beechey) in different latitudes, but more particularly on the coast of China—at Canton, Golongsoo, and especially when he surveyed the channel before Woosung, and surmounted all the difficulties in the navigation of the Yang-tse-kiang, during the advance of the British on the city of Chin-kiang-foo, are to be found in the Gazette of 1841 and 1842. His accurate description of his track left nothing to be desired.

Captain Collinson's astronomical observations, together with his contributions to the geography of Arctic America, have already appeared in the Society's Journal, vol. xxv., and are highly appreciated for having corroborated and given a more fixed character to our knowledge of those regions.

While carried forward by his great zeal and courage, and far

beyond any of his predecessors—no ship having been there before—it must also be remembered that this officer exhibited peculiar skill and prudence in the selection of his route, in overcoming great impediments and the opposing current, and, lastly, in re-conducting his ship from that dreary solitude and monotonous waste of waters in safety to his own country.

A detailed list of his geographical positions has been printed in the Journal, and a synopsis of his meteorological, tidal, and other scientific observations has been deposited with the Society.

The President then addressed the recipient of the Founder's Medal in these terms:—

“ Captain Collinson,—As a friend of Franklin of thirty-five years' standing, and as one who has had his heart set upon never ceasing to search the Arctic regions until we obtained true tidings of the fate of that great explorer and his gallant companions, I enjoyed the sincerest gratification when our Founder's Medal was unanimously voted to you at a full Council where you only (at my own request) were absent.

“ Gratified as I have invariably been in seeing all our Arctic explorers rewarded, it truly gladdens me to have your name added to the list of those noble British seamen who have received our highest distinction for their meritorious services, whether in the cause of Arctic geographical discovery or in the subsequent searches after Franklin.

“ When we know how perseveringly you endeavoured to realise a north-eastern passage from Behring Straits, by carrying your sailing ship, the *Enterprise*, to a more northern latitude in that meridian than any British seaman had attained, and that, trending a large part of the north coast of America, you pushed your vessel up the eastern side of Banks Land to nearly the same point as your eminent brother medallist M'Clure, and that when foiled by the great packs of ice you retraced your steps, and, nothing disheartened, still threaded your way eastward along the mainland until you reached the open sea between Victoria Land and King William Island, whence you brought back your ship to England, I have strong grounds for saying, that we mete out but simple justice in granting to you this distinction.

“ There is yet, Sir, another reason which operates strongly in satisfying me that you are well worthy of this or any honour which may be conferred on you. You warmly advocated the last search after Franklin; and if your judicious suggestion had been complied with, of sending once more a vessel by Behring Straits to the spot whither you went and whence you returned, and on the successful repetition of which you staked your well-earned reputation, we should now feel no anxiety respecting the isolated efforts of M'Clinck; whilst, to the eternal credit of our country, the problem of the fate of Franklin would in all probability have been for ever solved.

"For all these reasons, and also because, though not chosen to perform any part of the noble mission on which your mind was bent, you have earnestly laboured in carrying out the last Franklin Fund Subscription in aid of the survey undertaken by your younger brother officer M'Clintock, I have the sincerest pleasure in putting this Medal into your hand."

Captain Collinson then replied:—

"Mr. President,—I must ever retain a lively recollection of the kind and impressive manner with which you have conveyed this honour—an honour which is greatly enhanced in my estimation by its having come through the hands of one who not only holds so eminent a position in the scientific world, but who has taken so deep and unswerving an interest in that great cause which has led to its bestowal. I receive it, Sir, as the tribute which Knowledge pays to Enterprise. Hand in hand the two sisters have worked together, the one, by laborious study and close reasoning, pointing out the path which the other, firmly relying on the matured judgment of her elder sister, has unhesitatingly followed, until, in this our day, we have seen the Himalayas mapped, a great portion of the interior of Australia explored, an Antaretic continent discovered, the water boundary to America established, and last, but not least, Africa permeated.

"These results have to a great extent exhausted the field of exploration, but a higher and a nobler task awaits their efforts; we have to turn them to good account; and whether we go forth as settlers to occupy, or as merchants to exchange our manufactures for the natural productions of these distant regions, we have to diffuse among their inhabitants the comforts of civilization, the advantages of free institutions, with the blessing of that true and holy religion under the special providence of which we have spread from an insular kingdom to a mighty empire.

"Though these things are rapidly coming to pass, we cannot expect to see them fully realised; after ages will, however, acknowledge with gratitude the furtherance which they have received from the influence of this Society—a Society through whose annals the public is made acquainted with the progress of discovery, where the field of ambition is opened to the young geographer, who is shown the best means of accomplishing his object, and where (but with diffidence I now say it) a generous stimulus is given to scientific research and to perseverance under difficulty, by the distribution of honourable distinctions, such as it is my good fortune to have been deemed worthy of deserving.

"I have to thank you, Gentlemen, for the kind reception you have given to the award of the President and Council. Your cordiality has afforded me a life-long gratification; it sends me to my seat with the assurance that on this occasion I may assume the motto of that illustrious seaman who made the signal 'England expects every man to do his duty'—'*Palmarum qui meruit ferat.*'"

A D D R E S S
TO THE
ROYAL GEOGRAPHICAL SOCIETY
OF LONDON;

Delivered at the Anniversary Meeting on the 24th May, 1858,

BY SIR RODERICK IMPEY MURCHISON,

G.C.St.S., D.C.L., M.A., F.R.S., &c.,

PRESIDENT.

GENTLEMEN,—At the last Anniversary it was my mournful task to advert to the great losses we had sustained by the decease of my two predecessors as well as of several other geographers of distinction. Although on this occasion the hand of death has not fallen so heavily upon our leaders, we have still to lament that some of our most distinguished associates have been taken from us. At the head of this list I unquestionably place the name of one who, after a long and well-spent life, has passed away in the ripeness of age, having won for himself the admiration of all those who knew him during the last half century. That man was Rear-Admiral Sir Francis BEAUFORT, who, whether we look to the bravery, zeal, and talent he displayed in his earlier days as a naval officer afloat (one whom every sailor would have followed to the death), or to his maturer years when he shone as the bright scientific light of the British Admiralty, has his memory embalmed in our love and respect.

I will not now attempt to lay before you details respecting a seaman whose naval career and professional merits have already been ably and succinctly delineated by his old associate in arms, Admiral Smyth, in the Journal of the Royal Astronomical Society. Due honour to his name and deeds will doubtless further be paid in the ensuing anniversary discourse of the President of the Royal Society, of which parent body he was also a distinguished

member. In the mean time many salient and characteristic anecdotes of him having been chronicled in periodicals,* my present aim will be confined to a brief sketch of his career and the record of those incidents which directly connect him with the Geographical Society.

Born in the year 1774, young Beaufort owed his first instruction in geography to his father, the vicar of Collon and rector of Navan in Ireland, who made one of the earliest good maps of that country. Entering as a cadet in the East Indiaman *Vansittart*, he assisted in surveying the Strait of Banca, and narrowly escaped death after shipwreck. Serving successively in different ships of the Royal navy, he took part in Lord Howe's memorable victory of the 1st of June, 1794, and acting under Admiral Cornwallis was present in his celebrated retreat of the 17th of June, 1795, and assisted in the capture of many privateers and other ships of the enemy. On the coast off Malaga, he afterwards captured the Spanish polacca *San Josef* when protected by batteries and a privateer by boarding her from boats; not, however, without receiving many wounds, for which splendid service the young Lieutenant was rewarded with the rank of Commander. From that period (1800) until he obtained the step of Captain in 1810 he was busily employed in convoying fleets to India, partaking in the expedition to the Rio de la Plata in 1807, or hovering round the enemy's ports in Europe. In command of the fine frigate *Frederikstein*, he surveyed the south coast of Asia Minor from 1810 onwards, and afterwards gave to the public that remarkable work '*Karamania*,' which holds so high a place among our standard writings on geographical and antiquarian science. While on the survey of that coast he was badly wounded by a Turk, but was still enabled to complete his work so as to supply excellent charts for the Admiralty of the coast of Karamania. After some interval our deceased member was appointed in 1825 to the post of Hydrographer, which he filled with unrivalled success until two years before his decease, when his advanced age and infirmities compelled him to resign, to be succeeded by his distinguished élève Captain Washington.

In reviewing the useful and practical life of Beaufort, it can truly be said that during 26 years he so directed the Hydrographical Office that it became the model which all other governments sought to follow. It was indeed gratifying to men of science to see the

* See particularly a lively and characteristic sketch of Sir Francis Beaufort, '*Daily News*,' January 15, 1858.

friend and companion of Wollaston, of Young, and of Davy placed at the head of the Scientific branch of the Navy—not as a mere servant of a Board, but as a man with mind and energy to think and act for himself. Nor was it long before proofs of his influence and activity became visible. Seconded by an able staff of surveyors, proud to serve under one so competent to appreciate their labours, he soon gave them occupation. FitzRoy, worthy pupil of such a master, was despatched to complete the survey of South America; Belcher, Kellett, and Wood were sent to examine the south coast of Central America and of Mexico; Vidal, Denham, Skyring, and Arlett were charged to complete the west coast of Africa; Blackwood and Owen Stanley, names dear to every lover of science, undertook the survey of the north-east coast of Australia and of New Guinea. Sullivan went to the Falkland Isles and the river Plate, Stokes and Drury to New Zealand, Bate to Paláwan, Belcher, Kellett, and Collinson to China, Owen and Barnett to the West Indies, Bayfield and Shortland to the St. Lawrence and Nova Scotia, Graves and Spratt (the pupils of Mediterranean Smyth) to the Greek Archipelago, Hewett to the North Sea, Beechey to the Irish Sea, while many others spread their labours over different portions of the coasts of the United Kingdom. Forbearing on this occasion to expatiate on the merits of the many distinguished and zealous surveyors who carried out these researches in various quarters of the globe—men whose names have been often mentioned in our volumes, and some of whom have obtained our highest honours—I have no hesitation in affirming that the master mind of Beaufort, which directed such noble efforts during a quarter of a century, did more for the advancement of maritime geography than was effected in the same time by all the surveyors of other European countries united. Nor was it seamen only—but all men of science, as well as every traveller and geographical explorer of unknown lands, whether native or foreign, who always obtained from him the clearest information, which was communicated in the heartiest manner. Indefatigable in the transaction of business, and not trusting to others what he could do with his own compass and pen, there was no public servant who more uprightly served his Sovereign and his country.

By his official labours he brought up maritime surveying to the state of improvement it now exhibits. Beginning with our own shores at a period when all knowledge respecting them was fearfully inaccurate, he originated that series of works which, as I have

already mentioned, he extended to nearly all the coasts of the world. Nay, he also issued so long ago as 1831 those instructions for deep sea soundings which Lieutenant Maury and others have since matured. Such great plans were, indeed, but commensurate with Britain's naval supremacy, and were really called for. Although much was done, still much more might and would have been done had Beaufort had his way ; but parsimony (such, indeed, as seems to be periodically and, as it were, spasmodically exerted by economists in depressing our naval and military establishments) threw back, for a quarter of a century, those results which our lamented member would speedily have obtained, to the great advantage of the nation and the saving of innumerable lives from shipwreck !

Whilst presiding over geographers, let me further remind you of the obligations of the nation to Francis Beaufort independently of his intensely hard official work. For, he was the individual of that Society which, under the guidance of Lord Brougham, gave such an impetus to the Diffusion of Useful Knowledge, and who laboured perseveringly and successfully for many years in editing and bringing out the collection of maps issued by that meritorious body. From the allusion to a Society in which I played a much more humble part, I hope to be excused if I say a few words respecting my own connexion with the late Hydrographer, as they may serve to shadow forth to those who knew him not, other traits of his noble character.

First making his acquaintance at the house of the illustrious Wollaston, I could not fail to observe in both these great men the same truthful singleness of purpose and the same inflexible resolution to carry out their well-matured designs for the advancement of science. Always admiring and cultivating the friendship of Francis Beaufort, it has been my pleasing duty, whether as your President or one of your Council, to have had much intercourse with him, and also to have had the honour of being associated with him in drawing up some instructions for the exploration of distant realms. On no one, however, of those occasions have I seen the kindest feelings of his breast so much roused, as during the recent efforts of this Society to animate the country and the Government to make a last search for Franklin and his missing ships. In all the great tentative efforts which Britain made during a series of years to discover the traces of that lamented navigator, Francis Beaufort was indeed ever (as he is represented in a well-known engraving)

the centre of that group of distinguished explorers and friends of the missing navigators—the animus from which proceeded the devices and arrangements of the Arctic expeditions.

As he never abandoned hope, so long as his mind's eye could discern in the distant perspective a single plank of the *Erebus* and *Terror*, nor shrunk from endeavours, so long as there was the remotest chance of saving the life of one of the fine young officers and men of Franklin's ships, I recur with delight to the scene when, in his 83rd year and reclined upon his couch, his face beamed with joyous hope when he put his hand to that memorial which I had the honour to present to Her Majesty's Government, praying for a last and limited search after the relics of the missing expedition. Nor, when that appeal, which sought to send a Collinson once more to the area which he had so nearly approached, and from which he so skilfully brought back his ship, had unfortunately failed, can we forget with what renewed fervour the retired and venerable Hydrographer united with us in promoting and sustaining the efforts of the magnanimous woman who alone undertook the task of sending out the expedition under M'Clintock, to the issue of which we all now look with such deep anxiety.

In short, it was a genuine and innate kindness of soul, united with the highest moral worth and the brightest intellect, as displayed throughout his long life, that attached every friend to him with an abiding regard, and obtained for Francis Beaufort a reputation which will endure as long as the English nation shall honour one of her truest worthies.

Sir Francis Beaufort attained the rank of Rear-Admiral in the year 1846, and in 1848 was decorated with a Commandership of the Bath. He had also the honour to be a Corresponding Member of the Institute of France, a D.C.L. of Oxford, and an honorary member of various foreign Societies. He had long been a distinguished Fellow of the Royal Society; was one of the founders of this Society, and I need scarcely remind you that he was ever the most zealous and enlightened supporter of our onward progress.

In the Obituary of last year I spoke to you of the merits of one of the brightest lights of British geological science in the late Dean Buckland, and now it is my sad duty to advert to the other kindred spirit of the University of Oxford, the Rev. William CONYBEARE, Dean of Llandaff, who, when I entered upon the pursuits of geology, was one of my respected leaders, and to whom I became sincerely attached. The son of the rector of Bishopsgate, and the grandson

of a dean of Christchurch, William Conybeare was born in 1787, and educated first at Westminster; his earlier acquirements being matured at Oxford, where he was distinguished as a scholar. He no sooner quitted the University of Oxford, in which he had taken high honours at the same time as the late Sir Robert Peel and the present Archbishop of Dublin, than he spent the leisure hours of a country clergyman in recording the natural phenomena of the subsoil and its products. Becoming a member of the Geological Society, he gave to that body his first Memoir in 1814, and eventually prepared, in conjunction with Mr. W. Phillips, 'The Geology of England and Wales' (1822). By that excellent work, of which his associate undertook the mineralogical portion only, Mr. Conybeare fairly established himself as one of those who, following in the track opened out by William Smith, of identifying strata by their fossils, were the founders of that British geology which has sent its types and nomenclature through the world.

Any one who may refer to this volume will see how invariably the author adopts the true method of geological arrangement, by beginning the description of each natural deposit in the crust of the globe by a clear delineation of its geographical outlines and the character of the country. Even in his 'Introduction' we find comprehensive views of the structure of the earth enunciated with the enthusiasm of a real lover of geographical discovery, when he thus incites the geologist to push on fearlessly in the search after truth—"how little comparative curiosity should we feel concerning the course of the Niger or the North Coast of America could they be as easily examined as the Thames and the Channel!" In every chapter of the same work we meet with sketches of the surface and external characters of each tract, as well as the heights of the hills, and the phenomena of wells and springs (all of them integral geographical data), duly interwoven with an account of the chemical and mineral qualities of the subsoil, the imbedded fossils, and the erosion and fractures to which the strata had been subjected. Again, the long, coloured section, from the Land's End on the west to the German Ocean on the east, is in itself a fine sample of the generalising powers of Conybeare; for although geology has made vast strides since the year 1822, many of the features of this remarkable picture of the then state of our knowledge are still as true as when the author sketched them with the bold hand of a master.

In the same year Mr. Conybeare also displayed his talents as a

naturalist and comparative anatomist, by his notice of a then unknown fossil reptile, which he showed to be a link between the ichthyosaurus and the crocodile, and to which he assigned the name of plesiosaurus. This memoir, and another on the same subject in the succeeding year, created a most lively sensation among all naturalists, and winning the admiration of Cuvier, obtained for our deceased Associate the honourable post of correspondent of the Academy of Sciences. But I will not attempt to enlarge on these geological and palæontological triumphs, as my contemporary General Portlock has done ample justice to them in his recent Presidential Discourse, addressed to the Geological Society, in which he has successfully delineated the scientific merits of William Conybeare.

Retiring gradually from the toils of the geologist, and restricting himself to those clerical duties and theological readings which enabled him to obtain the dignity in the Church which he occupied for some years before his death, the last geological effort of Mr. Conybeare was his Report on the Progress of Geology, which, as a spectator more than an active workman, he gave to the British Association for the Advancement of Science, when they held their first meeting at Oxford in 1832.

The masterly manner in which he then grouped the various data, and recorded the advances made in the years which had elapsed since he was himself a contributor to the science, produced a deep feeling of gratitude on my part; for he encouraged me by the assurance that the distinction which had then been recently conferred upon me by placing me in the chair of the Geological Society had been worthily vindicated by my labours in the North of Scotland at one end of the European scale, and in the Alps at the other, as exhibited in a great section across Europe which he had prepared.

This approval of so eminent a man was indeed a main cause in leading me to make other exertions, which up to this day have not been discontinued; and whatever little merit they possess, I feel that they have been to a great degree elicited, first by the works and example, and then by the advice and approbation, of William Conybeare. For, even in succeeding years, when retired in his deanery at Llandaff, he again incited me, after my journeys in Russia, at once to publish a geological map of Europe; saying that the area which, in conjunction with my friends, I had laid down in that vast empire would enable any compiler to deprive myself

and associates of the honour which justly belonged to us, of producing the first Geological Map of Europe arranged on the principles of British classification.*

Long as I have been connected with the pursuits of science, I never yet met with any one of its cultivators who had a more ingenuous love of truth than Dean Conybeare; and I can safely affirm that he was universally beloved in the Geological Society, in which he bore so conspicuous a part. In addition to his scientific acquirements, the Dean of Llandaff was one of the best Greek scholars of his day, and was as deeply read in classics as in that ancient literature of the Church, in the study of which he passed many of the latter days of his life—happy in seeing that the true learning, high principles, and right feeling which he had implanted in the minds and hearts of his sons (of whom, alas! he had lost two) were raising them in the walks of life they had respectively embraced, to positions in which they are doing all honour to the name of Conybeare.

Rear-Admiral Sir John Ross, K.T., C.B., who was born in 1777 at Balsaroch, Wigtonshire, entered the Royal Navy in 1786, served in the Mediterranean until 1789, and afterwards in the Channel. He was in the expedition to Holland, and also under Sir James Saumarez. In 1808 Lieut. Ross acted as Captain of the Swedish fleet, and was made a Commander in 1812. During his war services in three different actions he was wounded thirteen times.

In 1817 the Admiralty having resolved to attempt to solve the question of the North-West Passage, Commander Ross was appointed to the *Alexander*, and Lieut. W. E. Parry to the *Isabella*; they sailed in 1818, and having made the circuit of Baffin Bay, returned to England the same season, when Ross was promoted to the rank of Captain. In 1829, aided by the munificence of Mr. Felix Booth, he purchased the *Victory*, a steam-vessel of 150 tons, to follow up the discoveries already made in the direction of Barrow Strait.

The *Victory* sailed from England in 1829, Commander (now Sir) James Clark Ross being second in command. Having visited the

* As soon as the geological map of Russia was published (1845), embracing nearly two-thirds of Europe, and that my colleague de Verneuil had produced a map of Spain (the only then remaining *terra incognita geologorum* of Europe), it was evident that a general map might then be constructed chiefly by compilation. I delayed so long in profiting by the sound advice of Dean Conybeare, that when my map of Europe appeared in 1854, it was soon followed by the large and brilliantly coloured map of Dumont of Liège. The cartographer will at once see, by comparing them, how vast a portion of the work of my eminent Belgian contemporary has been derived from the map of Russia.

wreck of the *Fury*, in Regent Inlet, the *Victory* reached Cape Garry in August, 1829, and thence proceeded South-West to lat. 70° North, and long. 92° West, when an impenetrable barrier of ice finally compelled her to winter in Felix Harbour. During 1830 Captain Ross could only move the *Victory* about four miles, and in the following year merely gained a port fourteen miles farther, now named Victoria Harbour, where, after another winter, he abandoned his vessel, in May 1832. Exposed to much danger, the party made their way northwards to about lat. 74° North, and long. 90° West, but want of provisions and the approach of winter obliged them to return to Fury Beach, which they reached on the 7th of October, about three years after the time they passed it on their outward voyage. Here they lived in a hut 32 feet long, made from the wreck of the *Fury*, and passed another dreary winter amidst privation and considerable suffering.

On July 8th, 1833, Captain Ross and his party made a last effort to escape. Dragging the sick to the boats, they embarked, and crossing the inlet to Cape York, reached a point East of Navy Board Inlet, where they fortunately got on board the whaler *Isabella*, formerly commanded by the gallant Captain himself, and in October they arrived in England, to the joy of us geographers, who, failing to induce the Admiralty to send out a searching vessel, had commenced a subscription for the purpose.

In the same year 1833 Capt. Ross deservedly obtained the Gold Medal of this Society "for discovery in the Arctic Regions of America," and the Gold Medal of the Geographical Society of Paris, together with various foreign orders, including that of the Swedish Polar Star; and in December, 1834, he received the honour of Knighthood together with that of C.B.; his patron, Mr. Felix Booth, being raised to a Baronetcy by King William IV., who entertained a personal regard for our deceased Associate. A committee of the House of Commons assisted by scientific men appointed to investigate the results of this expedition declared that they saw no reason to doubt that Captain Ross nearly approached, and that Commander James Ross had actually reached, the Magnetic Pole.

Sir John Ross was the author, among other works, of *Letters to Young Sea Officers*, *Memoirs and Correspondence of Admiral Lord de Saumarez*, and a *Treatise on Navigation by Steam*: he also translated and edited a *Memoir of Admiral de Krusenstern*, which was dedicated by permission to this Society.

This gallant officer and persevering explorer was promoted to

the rank of Rear-Admiral in July, 1851, and died in November, 1856.

By the death of the Rev. Sir Henry DUKINFELD, Bart., I lose one of my oldest and most steadfast friends. He was the third son of Sir Nathaniel Dukinfield, Bart., of Stanlake, Berks.

Educated at Eton and Oxford, and there forming intimacies which lasted through life, Henry Dukinfield had been for many years a zealous and devoted provincial clergyman before he succeeded to the title by the death of his elder brother Sir Lloyd. After he had performed his duty in an exemplary manner for 18 years as Vicar of St. Giles's, Reading, that eminent scholar the late Dr. Blomfield, Bishop of London, selected Sir H. Dukinfield to assume the important duties of Vicar of St. Martin's in the Fields, most of the parishioners of which were, at that time, in avowed hostility to their pastor. And never were duties more earnestly, sedulously, and honourably performed. His influence throughout that populous parish became so felt from the peer to the humblest artisan, and he so laboured in calming rivalries and disputes in the vestry, that when from the state of his health he found himself compelled to retire from the active scene, he received the heartiest thanks from all his flock, as well as from numerous Dissenters; with the expression of their deep regret at being deprived of his aid and counsel.

Having long thought that habits of cleanliness were essential to the raising of the humbler classes in their moral condition and well being, he worked out and completed a favourite scheme at which he had been labouring for some years, of establishing cheap public baths and wash-houses; and though necessarily excluded by his profession from a seat in Parliament, the Act which sanctioned these highly useful adjuncts to the comfort of the people is, and will always be, known as *Sir Henry Dukinfield's Act*.

After retiring from St. Martin's, and during his latter years, far from being contented to live a life of idleness, he never failed (and, as I can testify, often when unwell) to assist his overworked brethren in the Church. He also took the liveliest interest in establishing the New Hospital for Sick Children, and so supported it for six years by personal superintendence, preaching sermons, and procuring subscriptions in addition to his own, that as chairman of the Committee he was justly considered the mainstay of that useful establishment.

With these legacies to his country, Sir Henry Dukinfield left behind him such a character for probity, kindness of heart, and un-

tiring zeal in the promotion of every philanthropic object, united with the manners of a high bred gentleman and the acquirements of a scholar, that he was justly regarded as a pattern of a Christian whose deeds were continual proofs of the sincerity of his faith. He married the widow of the distinguished Peninsular officer Lieutenant-General Chowne, who, as well as his only sister Mrs. Prichard Smith, survive to mourn his loss. As he left no male heir, the ancient baronetcy conferred by Charles II. on the son of the "gallant and honest" Colonel Dukinfield of Dukinfield, Cheshire, so distinguished in the Civil Wars, has become extinct.

Sir George DUCKETT, Bart., M.A., F.R.S., who was one of the early Members of this Society, having joined it at its commencement, in 1830, died on the 15th of June last, at the age of 78. He was the son of Sir George Jackson, Bart., formerly Secretary to the Admiralty and Judge Advocate, and many years M.P. for Colchester and Weymouth; the name of Duckett having been assumed after his maternal grandfather. He represented Lymington from 1807 to 1812, was a Deputy Lieutenant for Herts, and at one time was Colonel of the West Essex Militia.

Sir George was a zealous supporter of science, a profound classical scholar, and a good linguist; having translated various Scriptural works from the German. In private life he possessed many amiable and excellent qualities, and his death was deeply deplored by all those who knew his worth.

Charles William, Earl FITZWILLIAM, K.G., F.R.S., another of the early members of the Society, died on the 14th October last, at the age of 71. The only son of William, fourth Earl Fitzwilliam, he was educated at Trinity College, Cambridge, and as Lord Milton represented the county of York in the House of Commons in seven successive Parliaments between the years 1807 and 1833, and succeeded to the Earldom on his father's death that same year. Earl Fitzwilliam was essentially manly and honest as a public man, and among the many traits of benevolence by which his conduct was characterised, no one was more conspicuous than his early and unceasing endeavours to bring about an abrogation of the corn laws. Blessed with a deep sense of religion, and largely exercising the gifts of charity, the liberality of this public spirited and upright nobleman extended itself to science both in a pecuniary form and in rendering personal assistance.

Nor had any one a juster appreciation of the public value of scientific pursuits. As far back as 1831, when few senators had

given encouragement to science, and when I was one of the few men who assembled at York to support the scheme suggested by Sir D. Brewster, and worked into an efficient system by my enlightened friend William Vernon Harcourt, Lord Fitzwilliam, in describing the benefits to be expected from the institution of the British Association for the Advancement of Science, over the first meeting of which he presided, thus spoke: "I hope that the meetings thus auspiciously begun, will rapidly advance to still greater importance, and become the source of incalculable advantage to science hereafter. In addition to other more direct benefits, I hope they will be the means of impressing on the Government of this country the conviction, that the love of scientific pursuits and the means of pursuing them are not confined to the metropolis; and I hope that when the Government is fully impressed with the knowledge of the great desire entertained to promote science in every part of the empire, they will see the necessity of affording it due encouragement, and of giving every proper stimulus to its advancement."

The death of this good and patriotic nobleman was as deeply deplored by all those persons of the upper and middle classes who partook of his widely-spread hospitality, as by the masses of the people, of whom he was the ardent friend and protector.

The life of Lieut. J. Baptiste HOLMAN, well known under the name of the "Blind Traveller," was a special illustration of the pursuit of knowledge under apparently insurmountable difficulties. At the age of twenty-five he was obliged to leave the naval service, a profession of which his active mind and singular aptitude for the acquisition of practical information would have rendered him a distinguished ornament. The illness which ended in the total deprivation of sight resulted from the anxious discharge of his professional duties. At first some hope was entertained that his sight would be preserved, but when at length it became certain that there was no prospect of recovering the power of vision, his resolution to adapt himself to these distressing circumstances showed at once that mental courage which was afterwards so remarkably developed. The appointment as a Naval Knight of Windsor seemed to afford an easy retreat from turmoil to a person in his circumstances. But the seclusion of Travers College was ill-suited for his anxious mind; and his bodily health also suffering from that routine life, he obtained permission to travel. His first journey, made in the years 1819, 1820, and 1821, was through France, Italy, Switzerland, and parts of Germany bordering on the Rhine, Holland, and the

Netherlands. The narrative of these travels went through four editions.

In his next journeys he traversed Russia, Siberia, Poland, Austria, Saxony, Prussia, and Hanover, during the years 1822, 1823, and 1824. While passing through the Russian territories he was suspected to be a spy, and was conducted as a state prisoner from the interior of Siberia to the frontier; having penetrated during that journey to 1000 miles beyond Tobolsk. Nor is it the least wonderful feature in these enterprises that, although when at home he was always attended by a servant on whose arm he leaned, he never on any occasion took a servant abroad, always travelling alone, and trusting to his own sagacity, and the sympathy which never failed him wherever he went, for safe conduct through all emergencies and perils. His Russian travels, curious in their details and full of adventure, ran through three editions.

In 1834 he published his principal work, recording a still wider field of research, entitled a 'Voyage Round the World,' in four volumes. This publication was dedicated to Queen Victoria, through whose kindness he had previously obtained a dispensation from residence at Windsor; an act of gracious protection which he spoke of to the last hour of his life in terms of deep gratitude. The 'Voyage Round the World' may be considered his most elaborate production. It embraced the Journals of a vast route, including Africa, Asia, Australasia, and America, as explored between the years 1827 and 1832; and is, in reference to the mass of information it contains, and the peculiar situation of the author, an extraordinary literary monument of energy and perseverance.

Although Lieut. Holman had now twice circumnavigated the globe, visited most countries, and made himself familiar with their geography, internal industry, and external relations, the passion for exploring distant scenes and gathering fresh information survived even the physical strength necessary to its safe indulgence. Of him, indeed, it may be said, that his eager soul subjected its feeble tenement to the severest tests. Few men of the strongest constitutions could have endured the fatigues which the Blind Traveller voluntarily undertook; and at an age when most men seek repose, he was still found in motion, on the Danube or near Constantinople; attending to the processes of wine making in Portugal, or visiting the scene of some Scriptural tradition at Jerusalem. His last journeys were made through Spain and Portugal, Wallachia, Moldavia, and Montenegro, Syria and Turkey, and his final employment was the

preparation for the press of his later journals, which experience and matured observation had rendered more valuable than any of his former records of travel. The whole of these, and a large mass of miscellaneous papers, are in the hands of his friends, and it is to be hoped they will be given to the public, accompanied by an adequate biography of this remarkable man. The character of Lieut. Holman was eminently calculated to command respect and conciliate attachment. Patient, gentle, and firm, he was beloved by his friends, and won the confidence and regard of the numerous and varied circles by which he was at different times surrounded.

Mr. Joseph Ravenscroft ELSEY, who died in January last in the West Indies at the early age of twenty-four, had already distinguished himself as a naturalist and explorer, as recorded in our Journal.

Educated at the London University and College of Chemistry, and passing at the Royal College of Surgeons, he was appointed as surgeon and naturalist to the North Australian Expedition, under our Medallist, Mr. A. C. Gregory. The zealous and efficient manner in which he fulfilled the arduous duties attached to his post, during twenty months of toilsome travel, won for him the high praises of his commander, and the friendship and admiration of his associates. On his return to England he communicated a paper to this Society on North Australia, and was soon after offered the appointment of Government surgeon at Seychelles, which he however declined, preferring to go to the West Indies, with a view to the collection of natural history specimens. He had scarcely been six weeks at his post when he was attacked with what at first appeared a slight illness, but which soon terminated fatally; and there is too much reason to believe that his untimely end was attributable in great measure to over-fatigue and privation when engaged in the North Australian Expedition.

The late Earl SPENCER, K.G., was born at the Admiralty, Whitehall, his father having for many years presided over that department of the Government. He adopted the Navy as his profession, entering that service in 1811, a few months before he attained his fourteenth year. In September, 1825, he was appointed to the command of the *Talbot*, 28. While in that ship he served in the Mediterranean, under the late Admiral Sir Edward Codrington, in which he fought with distinction at the battle of Navarino, was present at the capitulation of Patras, and assisted at the reduction of the Morea Castle. For his conduct at the battle of Navarino the

noble Earl received the honour of C.B. In the latter years of his life he served as Lord High Steward of Her Majesty's Household, and was made a Knight of the Garter. Feeling that his health was rapidly giving way, he retired from office, and shortly after, on the 27th December, 1857, he expired, to the regret of his Sovereign and his numerous friends.

William Wilberforce BIRD, who was born in 1784, was the eldest son of W. Wilberforce Bird, of the Spring, Kenilworth, and Member for Coventry. In his boyhood he was at school at Warwick, but was sent to complete his education at Geneva. In 1802 he was nominated a member of the East India Civil Service, and went to Calcutta in 1803. After passing through the College of Fort William with considerable distinction, he was stationed at Benares, where he was early placed in situations of singular difficulty and importance. On one occasion, in the year 1809, a religious disturbance broke out, attended with great destruction of life and property, and it became necessary to call out the troops, whom he personally conducted into the heart of the city, and was enabled to disarm and disperse the infuriated people, and restore tranquillity. On another occasion an insurrection, in resistance of the introduction of the house-tax, which threatened very alarming consequences, was put down through the exertions of Mr. Bird; the multitudes being dispersed without the loss of a single life.

For these services Mr. Bird received the highest approbation of the Government for "the prudence, firmness, zeal, activity, and judgment which had marked all his proceedings." After this time, Mr. Bird was selected for other important situations, where peculiar fitness was required; and having been successively placed in the highest offices, both judicial and financial, was at length appointed a member of the Supreme Council of India, of which, in the absence of the Governor-General in the North-West Provinces, he became the President, and was four times nominated Deputy-Governor of Bengal, with the duties of which office he was entrusted during the whole period of Lord Ellenborough's administration. When that nobleman was recalled, Mr. Bird succeeded him as Governor-General of India until the arrival of Sir Henry (the late Lord) Hardinge, whose first act was to re-appoint him Deputy-Governor of Bengal. Mr. Wilberforce Bird took a prominent part in all the great questions of the time, and was particularly instrumental in the abolition of suttee, the suppression of

slavery, the discontinuance of state lotteries, the extension of Native education, and the more general employment of well-qualified Natives in the administration of public affairs. In 1844, having been in the service of the East India Company forty-one years, he retired, and returned to England. On his departure from Calcutta, addresses were presented to him by the European and Native inhabitants, expressive of their sentiments of respect and esteem for his character and conduct, both as a public officer and a private gentleman. He passed his remaining days in the privacy of domestic life, beloved by all his friends, and particularly by his associates of the old Raleigh, now the Geographical, Club. He died in London, after a few hours' illness, on the 1st June, 1857, aged 73.

The Rev. Dr. SCORESBY.—Although it is not my bounden duty to offer to you sketches of the lives of our countrymen who have not been members of our body, yet when a very remarkable explorer, voyager, or geographer, who has not joined us, is taken from this world, I follow the practice adopted some years ago of attempting to bring the striking points of his character to your mind's eye. A man eminently entitled to be thus singled out was the late Dr. SCORESBY, who, at the early age of ten years, commenced his career as a seaman under the auspices of his father, one of the most successful captains of the port of Whitby in the Northern whale fishery. Thus early inured to the hardships and perils of the Arctic seas, his mind was developed by the employment of the winter months in pursuing a course of study at the University of Edinburgh, where his assiduity and ability gained him the friendship of the professors, and laid the foundation of that knowledge which enabled him subsequently to offer in so admirable and clear a manner an account of the Arctic regions.

As chief mate of his father's ship, the *Resolution*, he had the honour of navigating to the highest northern latitude then attained by any vessel, viz. $81^{\circ} 30'$; and though Sir E. Parry, in his celebrated boat expedition during his fourth voyage in 1827, arrived at $82^{\circ} 45'$, the distinction of being second in the approach to the Pole yet remains with Scoresby and his father.

The account of the Arctic regions, being the result of 17 years' experience in those seas, appeared in 1820, in two volumes; and besides a vast amount of statistical information relative to the whale fishery, then the most important nursery for our seamen, this work contains so great a mass of scientific observation that it is still a text-book of nautical science.

In 1822 he succeeded in reaching the east coast of Greenland, which, by his indefatigable labours, was laid down on charts from the 70th to the 75th degree of latitude, and, taking in the bays and fiords, a coast line of 800 miles was defined correctly, and errors of previous charts, amounting to no less than 7° of longitude, corrected. An account of this remarkable voyage (dedicated by permission to King William the Fourth) was published the following year; and in a copious appendix, the pages devoted to mineralogy, botany, zoology, and meteorology, evince to what great profit the author had studied at Edinburgh.

In the course of a visit to the island of Jan Mayen, Scoresby detected one of the most remarkable proofs of the effect of the equatorial current. He found on the shores of that singular island (recently visited by Lord Dufferin) pieces of drift wood bored by a ptenus or pholas, neither of which animals ever pierce wood in Arctic countries, and hence he concluded that the worm-eaten drifted fragment had been borne by currents from a transpolar region. The notion of a constantly open polar sea Dr. Scoresby always believed to be chimerical.

He was the first also to attempt observations on the electricity of the atmosphere in high northern latitudes, and his experiments made with an insulated conductor eight feet above the head of the main-top-gallant mast, connected by a wire with a copper ball, attached by a silken cord to the deck, are still regarded with interest for their novelty and ingenuity.

This collection of scientific data was never permitted to interfere with the main objects of the voyage, in the pursuit of which he was most successful, and, notwithstanding a resolute determination, that the sanctity of the Sabbath should never be violated by the pursuit of the whale, his ship usually returned the fullest of the season. Some idea of his constant zeal may be found in the expression which he uses, that, when he went into the ice, he considered it was his own watch on deck until extricated at the close of the season.

Abandoning nautical pursuits in the year 1823, Mr. Scoresby gave a fresh and remarkable proof of his unbounded energy and great ability by mastering the difficulties attendant upon the adoption of the career of a divine. Setting to work with the assiduity of youth, he graduated at Queen's College, Cambridge, as B.D., in 1834, and was inducted to that Church of England of which he became a distinguished ornament. In short, he devoted many years of his life

to the arduous duties of chaplain among seamen, whose religious welfare he most zealously promoted; his sermons, while they breathed the true spirit of Christianity, being strengthened by a tone of philosophical reflection which imparted to them much dignity and freshness.

In the progress of Arctic exploration Scoresby continued to take the deepest interest. Although he had thought, from the first, that the attempts to find a North-West passage to the China Seas would prove to be unprofitable for political or commercial objects, he considered that the scientific results justified all the risk and expense of such expeditions; maintaining that, even in regard to financial returns to the nation, the establishment of the Davis Strait fishery and of the trade of the Hudson Bay Company had compensated for the expenditure of public money in the early voyages of discovery.

The scientific career of Dr. Scoresby in the latter years of his life is well known. He became a Fellow of the Royal Society in 1824, and subsequently was elected a Correspondent of the Section of Geography and Navigation of the French Academy of Sciences. The Edinburgh Philosophical Journal and various scientific periodicals were enriched by occasional contributions from his pen on a variety of subjects of natural history and meteorology. To the observations of magnetical phenomena he had long devoted close attention, and his investigations, published at intervals from 1839 to 1843, and the concluding volume in 1848, contain a vast amount of valuable materials for sound induction. His reports to the British Association, at the meetings of which body he was a frequent and welcome attendant, and his numerous observations on the influence of the iron of vessels on the compass, were connected with inquiries of the utmost practical importance to navigation. It was in prosecuting these researches, and with a view to determine various questions of magnetic science, that Dr. Scoresby undertook a voyage to Australia, from which he returned last year, with his constitution much enfeebled by the arduous labours he had undergone.

Of this good man we may truly affirm that his name will ever be remembered with honour among those who by their character and services have sustained the reputation and extended the influence of the British name by the peaceful triumphs of science and philanthropy.

Dr. Baron von REDEN was born in the beginning of the present century, in the kingdom of Hanover, and was well known for his good statistical and geographical works on Germany, Austria, and

Russia. He was chief director of the Statistical Bureau in Vienna, and possessed a considerable private collection of valuable ancient and modern geographical maps, was a Vice-President of the recently-formed Imperial Geographical Society of Vienna, and died unexpectedly a few months since.

At the last Anniversary, I laid before you a brief sketch of the discoveries of the ardent young explorer and good astronomical observer VOGEL, and reported the rumours of his death, but hopefully threw doubts upon their accuracy. Alas! they have proved too true; and since then the assassination of his faithful assistant Maguire, who was bringing home many geographical records, has cast a sad gloom over the exploration of Central Africa, and teaches us how grateful we ought to be for the escape of even the living traveller, Barth, who is now giving us so much information respecting those turbulent tribes.

The death of Vogel appears to be placed beyond a doubt by the account of the envoy of the King of Darfur, who arrived last autumn on an amicable mission to the Viceroy of Egypt. He relates the rumours which had reached him before he left Darfur, and repeats their details with minuteness. Much of his account refers to the proceedings of Dr. Vogel's colleagues; and as we know that what relates to Barth is accurate, there appear to be no grounds for doubting the truthfulness of the remainder, especially as the place where Vogel is said to have been executed by the order of the barbarous King of Wadai is at no great distance from Darfur.

Edward Vogel was the eldest son of Professor C. Vogel, Director of the Public School in Leipsic, where he, at an early age, exhibited a strong predilection for astronomy, there being a good observatory in that city. He afterwards completed his studies under the celebrated Encke at Berlin. Concluding his academical training, he came to England, I believe, in 1851, and was employed in the observatory of Mr. Bishop until he was sought out to proceed to Africa early in 1853, and join Drs. Barth and Overweg.

On the eve of his departure, when he was full of ardour and hope, I made his acquaintance at the house of his patron the enlightened Prussian Minister, Chevalier Bunsen, when his ingenuous manners, intelligent conversation, and knowledge of the natural history sciences, in addition to sound astronomical acquirements, led me to conclude that he was admirably qualified to carry out his mission, particularly in determining the geographical position of many places in Africa. Alas! that he is not only taken from us,

but that with him and poor Maguire we lose a great portion of the results of his arduous explorations and accurate observations.

M. von Neimen, a young German gentleman of good family, who went to Egypt solely with the noble object of penetrating to Darfur and Wadai, there to ascertain the fate of Vogel, I regret to say, died of a lock-jaw at Cairo.

The fate of the faithful and intelligent Corporal Maguire has been already narrated to you in our Proceedings. In his last moments he exhibited the same unflinching tenacity and bravery which had marked his conduct throughout. Appalled by no sickness and intimidated by no foe, this fine specimen of a British soldier killed several of his murderous assailants before he lost his own life.

GEOGRAPHICAL PROGRESS.

Britain — Admiralty Surveys. — Following the plan of my last year's Address, I begin with the account of the Maritime Surveys of Britain, for the substance of which I am indebted to my eminent friend Captain Washington.

The Coast Surveys in course of execution under the orders of the Admiralty both at home and abroad have made steady progress during the past year. They are conducted by twenty different surveying parties, one-half of which are employed on portions of the United Kingdom, the remainder in the colonies of Australia, Cape of Good Hope, West Indies, Nova Scotia, St. Lawrence, and Vancouver Island, also in the Mediterranean, Coast of China, and Red Sea.

British Isles. — The Coast Survey of the United Kingdom has reached a point at which we can confidently predict that a very few more seasons will place the public, and all who take an interest in geography, in possession of a complete representation of the British Isles, not only as their shores, islets, and rocks rise above the level of high water, but also as the whole group reposes upon a bed circumscribed by a boundary line of 100 fathoms in depth.

The study of the configuration of that line is instructive. It shows that the group, although apparently broken up into three large, and countless small, islands, is physically connected on the south-east, through Belgium and Holland, with the continent of

Europe, while it is separated from Norway and Sweden by a gulf or fiord some hundred fathoms in depth. Probably it may not be generally known that some of the deep wells in London and Sheerness draw their fresh water from a stratum which lies fully 300 feet below the level of the bottom of any portion of the North Sea that intervenes between this island and the coasts of Belgium, Holland, or Denmark. The physical geographer will therefore find, if he examines them, that nautical charts teach something more than the mere depth sufficient for the wants of navigation. This undoubtedly is their first and main use; but in the course of a rapid summary of their labours during the past year, I shall be enabled to show you that the Admiralty Surveyors have sounded hitherto unfathomed depths both in the North and South Atlantic, in the Indian Ocean, and in the Red Sea, and have brought up sufficient of the bottom to enable geologists to explain the structure of new continents, now forming at a depth of 2000 fathoms below the surface of the water.

England.—The re-examination of the river Thames, to which I referred last year, under Commanders Burstal and Cudlip, has been completed from Putney to Woolwich, and laid down upon the large scale Ordnance plans of 60 inches to a statute mile—a minute and careful survey, which will form a valuable standard for reference hereafter, when the labours of the Thames Conservancy Board shall have dredged a deep, uniform channel, navigable at low water up to the London Pool. The deepening of the bed of the river, consequent upon the removal of old London Bridge in the year 1832, has been striking, and holds out encouragement to reconstruct the old-fashioned bridges at Newcastle, Wexford, and Cork, which now act as dams in their respective rivers, as the Tyne, the Slaney, and the Lee.

On the east coast of England the chief topographical changes consist in the improvement of the entrances of the several tidal harbours. The channel of the Tees has been dredged and trained to a fair curve, which can hardly fail to deepen itself. A chart of Tees Bay, on the scale of 3 inches to a mile, has recently been published at the Admiralty. It includes Hartlepool and Redcar, and thus shows at one view all the sites that have been recommended in this immediate locality for a harbour of refuge—an imperative work that can no longer be delayed, when we look at the fearful loss of life from wreck that annually occurs on this coast. At the entrance of the Tyne large works are in progress, which we trust may do somewhat to improve the mouth of that important river, in

and out of which no fewer than 45,000 vessels pass yearly—a traffic only paralleled by that of the ports of London and Liverpool. At Blyth, too, much has been done to improve the entrance, and to guide the flood and ebb streams into one channel.

On the south coast of England the surveying party under Commander Cox and Messrs. Usborne and Davis are still engaged in the examination of the inner portions of Plymouth Sound, including Catwater and Hamoaze, as far as Keyham, in the course of which they have examined 27 miles of harbour coast-line, and sounded over 50 square miles. In Cornwall Captain Williams and Mr. Wells have surveyed 15 miles of the open coast from St. Germain's Beacon westward to the entrance of Fowey, with plans of the small harbours of Charlestown, Par, Polkerris, and Polperro, and sounded over 47 square miles. At the northern entrance of the Bristol Channel, Commander Alldridge and Mr. Hall have been employed on the rocky passage known as Jack Sound, where they have mapped 21 miles of open coast line, and sounded over 40 square miles, discovering many dangerous rocks hitherto not marked on our charts.

Farther north, on the West coast, Mr. E. K. Calver has sounded the new refuge harbour of Holyhead, which already has afforded shelter to 3500 vessels during the past year, and is daily more resorted to as it becomes known. He has also resounded the packet-harbour at Portpatrick, and has generally examined the coast and harbours between Bardsey Sound and Ardrossan, including the newly-formed harbour at Silloth, on the English side of the Solway Firth, and has shown that there exists a channel, having 15 feet at low water, for which the mariner, in case of need, may safely run his vessel at a time when the tidal harbours along this portion of the coast cannot be approached.

Scotland.—In Argyshire Commanders Bedford and Creyke and Mr. Bouchier have been employed on the coasts of Mull, Iona, Ulva, and Loch Etive, with the numerous adjoining islets, in the course of which work they have surveyed 112 miles of sea-coast and loch, and sounded over 90 square miles. In the detailed statistics which Commander Bedford has furnished of the progress of this season's survey, he states that the soundings were obtained by one officer, Mr. Bouchier, and his boat's crew; and it may give some notion of the minuteness of the survey, when I mention that, in the space of 90 square miles, they took 13,000 casts of the lead, the greatest depth being 97 fathoms. The neces-

sarily slow progress of the survey of these intricate coasts will be better understood perhaps from this single fact than from any general description that I might give.

In Inverness-shire Commander Wood and Mr. Forbes have surveyed 15 miles of the open coast of the Isle of Skye, from Loch Eishart westward to Loch Breatal, including the Soay isles and the remarkable lochs Scavaig and Coir-uisk (so admirably described by Walter Scott), and sounded over 83 square miles, reaching six miles off shore, and into a depth of 140 fathoms; while Mr. Jeffery has examined 40 miles of coast between Malag and Ru Arisaig, including the shores of Loch na Gaul.

In the Hebrides Captain Otter in H. M. S. *Porcupine*, with her tender the *Seagull*, assisted by a good working staff, composed of Messrs. Dent, Stanton, Stanley, and Cramer, has examined the shores and islets of the Sound of Harris, comprising, with all their indentations, 155 miles of coast line, in addition to sounding over an area of 435 square miles. This is an important service rendered to hydrography, as with this chart and the accompanying sailing directions before him, the mariner may safely run for the passage between Harris and North Uist, which has hitherto been avoided by all who could possibly escape from it. The chart is in the engraver's hands, and will be issued to the public in the course of the summer. At the same time Lieut. Thomas and Mr. Clifton have surveyed the rocky estuary of East Loch Tarbert, in Harris, and completed a chart of that remarkable inlet of the sea.

In alluding to these and other charts of the coasts of Scotland, I have real pleasure, as one acquainted with the value of detailed land surveys, in expressing my admiration of the maps on the six-inch scale, exhibiting all the physical features, which Captain Otter, Commander Wood, and their associates have laid down for three miles inland. Such terrestrial coast surveys may enable geologists to come to accurate conclusions respecting the general structure of Scotland before the geographical details can be worked out on Ordnance maps representing the interior of the country, and which will probably not be published for many years to come, even under the vigilant superintendence of Colonel James.

In the Orkneys no new survey has taken place; but six plans of the most important anchorages, surveyed in the year 1850 by the late Commander Thomas, have been published by the Admiralty during the past year; they are Otterswick, Pierowall, Stromness, Deer Sound, Long Hope, and the approaches to Kirkwall, all on a

scale of three inches to a mile ; with these charts, and guided by the lights, buoys, and beacons recently placed in these islands by the Commissioners of Northern Lights, the mariner may boldly run in case of need for the many sheltered anchorages which this group affords.

Ireland.—On the east coast of Ireland Messrs. Hoskyn, Aird, and Yule have completed the survey of Lough Carlingford, the coast adjacent, and the river up to the town of Newry, sounding over an area of 62 miles. In the course of this work a new deep-water channel, having 18 feet at low water, was discovered leading into the lough, which may materially aid in the execution of a plan which, it is understood, is shortly to be carried out, of rendering Carlingford Bay a harbour of refuge for the Irish Sea—an object greatly to be desired, and which might be effected at a trifling cost.

In Donegal, on the north coast, Captain Bedford, with Lieuts. Sidney and Horner, have mapped 50 miles of the shore line between Loughs Swilly and Foyle, including the remarkable promontory of Malin Head, and the Garvan and Innishtrahull group of isles, in the progress of which work 220 square miles have been sounded over, extending to 10 miles off shore. At the risk of being tedious, I must again be permitted to call attention to the statistics of this survey, during which more than 23,000 casts of the lead were taken, or on an average 35 casts to the square mile in deep water, and 625 casts to the square mile when within a depth of 10 fathoms. These are facts apparently trivial, but which all physical geographers, who care to have a *bonâ fide* representation of the submarine hills and valleys of our planet, will know how to appreciate. By permission of the Admiralty, the charts resulting from these surveys have been exhibited at our evening meetings, and have deservedly elicited your applause.

Those who are curious in such matters may like to know that the whole cost of such a survey to the country, including the soundings, when conducted in the most economical manner, is about 30% per mile of coast line.

In Kerry, on the south-west coast, Commander Edye, with Messrs. Macdougall and W. B. Calver, have examined 26 miles of the exposed coast of that long, projecting peninsula which separates Tralee and Dingle bays, its extremity forming the westernmost point of the mainland of the British Isles. They have also mapped Smerwick Harbour. On this coast the chart of Kenmare river, the

work of the late Commander Church, has been published during the past year, and gives a graphic representation of that remarkable region, interesting both to the geologist and geographer.

The coast of Kerry has just now another and a deeper interest, as Valentia has been fixed upon as the Eastern or European terminus of the Atlantic Electric Telegraph cable, which it is proposed to submerge in the course of the next month, and on this occasion, we heartily trust, with complete success, as the first experiment afforded many useful hints which will now be taken advantage of. The preparatory line of soundings, to which I referred last year as about to be undertaken by Commander Dayman, was most successfully completed in H. M. S. *Cyclops*, which carried a line of deep-sea soundings across the Atlantic from Valentia to Newfoundland, the detailed account of which has been published and largely circulated, and therefore is probably familiar to many of my hearers. As I shall, in the sequel, treat of the natural history results of this survey, under the head of Physical Geography, I will only say that the shelf or bank on which the British Isles repose was found to extend to the westward as far as the meridian of 15° , or about 180 miles off shore, when it suddenly dropped from a depth of 500 to 1500 fathoms. From the foot of this submarine cliff the bed of the ocean held an undulating course, varying from 1500 to 2400 fathoms, which depth was reached in long. 26° W. From this point of greatest depth the bed of the ocean gradually rises until, in long. 50° W., it reaches the outskirts of the bank on which the island of Newfoundland rests; it is round to the north of this shoal that the telegraph cable is destined to pass into Bull Harbour, near the south-western angle of Trinity Bay. Fully appreciating the value of Commander Dayman's soundings, and experience as a pilot, the directors of the Company have made it a special request to the Admiralty that this officer, now in command of H. M. S. *Gorgon*, may be allowed to accompany and precede the U. S. ship *Niagara*, with the western portion of the cable (after the junction has been made in the mid-Atlantic), and pilot her to her destination. You will doubtless all join with me in heartily bidding them God speed.

Mediterranean.—Of foreign surveys the Mediterranean claims precedence, as its shores were the earliest seat of civilisation, and must interest alike the antiquarian, the scholar, and the geographer. Notwithstanding the classic works of Beaufort, Smyth, and their successors, we have yet only imperfect surveys and vague accounts of a large portion of this region. In last year's Address I had

occasion to make honourable mention of a survey of the Delta of the Danube in the Black Sea, by Lieut. Wilkinson, under the orders of Captain Spratt. This has now been completed for the Kilia branch as well as for the Sulina and the St. George; and the facts brought to light in the course of the survey of the advance of the alluvial delta in one part, and its washing away by the inroads of the sea in another, have been usefully turned to account by Captain Spratt, in his Report 'On the Comparative Condition of the Branches of the Danube,' as a warning to the engineers engaged in the improvement of that river to be careful how they place ponderous stone walls on so unstable a foundation. At the same time it is shown, that with simple guiding, and a free use of the dredging-machine, there is a fair probability of the Danube being so improved, that vessels of moderate draught of water may load their corn at Galatz, and convey it without transhipment to Western Europe in safety. The plans which I have mentioned, by Lieut. Wilkinson, will doubtless be in request at the approaching Paris Conferences on the subject of the Principalities, and will well repay the labour of those who consult them.

Following up his deep-sea soundings of last year to the eastward of Malta, Captain Spratt has made some experiments on the surface and submarine currents of the Sea of Marmora, in which he shows that the surface current gradually diminishes and vanishes at a depth of 40 fathoms, and that no counter current is found below; also that the density of the water is not perceptibly greater from that level to the depth of 1500 fathoms; from which depth he has brought up by his sounding-lead some beautiful specimens of minute, delicate shells of *Cleodora*, *Limacina*, *Spirialia*, *Atlanta*, &c.

The survey of the eastern half of the large island of ancient Crete, or Candia (the Kirit Adassi of the Turks), by Spratt, Mansell, and Wilkinson, has been published at the Admiralty during the past year, and for the first time we have an accurate representation of that fertile and beautiful island (with Mount Ida towering to a height of 7000 feet), which was formerly so populous and civilised that Homer * speaks of its hundred cities, Κρήτη ἑκατομπολις. In modern times, and we trust before the close of the present summer, this island is destined to form the connecting link between the lines of submarine telegraph that are to unite Constantinople and Alexandria.

* See notice of Crete, by the Right Hon. W. Gladstone, in his new work on the Odyssey.

On the coast of Egypt Commander Mansell, with Messrs. Brooker and F. Skead, his assistants, have mapped the shore from Alexandria to Damietta, with plans on a large scale of the Rosetta mouth and the Bay of Abukir; this completes the coast as far as El Arish, and forms a positive and important acquisition to our knowledge of the geography of these regions. I may here mention that Captain Spratt has recently drawn up a Memoir on the proposal for a Suez Canal, in which he disposes of the fallacious argument, that because the Delta of the Nile does not sensibly advance on the sea, therefore the river has ceased to bring down alluvium, by showing that the Delta has advanced to such a point that the stroke of the sea, arising from the prevalent winds, is sufficient to keep it in check, but that the detritus is still brought down and carried away to the eastward, and forms dunes and sandhills which, at Kas Burún, rise to a height of 270 feet above the level of the sea. The survey of the coast of Egypt having been finished, we trust that the time has arrived when the shores of Palestine and Syria will no longer be permitted to form the opprobrium of our maps, and that, in the middle of the nineteenth century, we shall at last ascertain the accurate geographical position of such ports and places as Tyre, Sidon, &c., the names of which are found in some of the earliest records of the human race.

South Africa.—In the Cape Colony Mr. Francis Skead has surveyed the entrance of the St. John River, or Umzivubu, on the south-east coast, and has begun a closer examination of Table Bay. But the further survey of the coast to the eastward is paralysed by the want of a land survey of the colony, notwithstanding that each year as it passes away proves more strongly than the last that this want bars the progress of the settlers, hinders the development of the revenues of the district, and is attended with loss to the colonial exchequer. No one knows this better than Mr. Maclear, the enlightened astronomer at the Cape Observatory, and every time he sends home a fresh sheet of the printed account of the remeasurement of Lacaille's arc of the meridian (which has now reached the 234th page) he expresses his regret at the want of foresight evinced in not going forward with this survey.

Red Sea.—The increasing demand for telegraphic communication with India has led to the despatch of a vessel to carry a line of soundings from Bab el Mandeb to Suez. Captain Pullen, R.N., of H. M. S. *Cyclops* (known to most of my hearers for his hardy boat expedition in the Arctic Sea from Point Barrow to the Mackenzie, in the

year 1849), was selected for this service. The ship being well fitted for deep sea sounding, a few deep casts were made in the Atlantic and in the Indian Ocean on the passage out. First the lead was dropped at the site of the *Devil* Rock, in the North Atlantic, which has been so often reported, and also at the *Hannah* Shoal, in $10^{\circ} 7' \text{ N.}$ and $27^{\circ} 32' \text{ W.}$, and no bottom found with 2000 fathoms of line: these two *vigias* then, as far as a radius of 50 miles each extends, are swept from our charts. In $4^{\circ} 16' \text{ N.}$ and $28^{\circ} 42' \text{ W.}$ bottom was got at 2100 fathoms. In $2^{\circ} 42' \text{ N.}$ and $28^{\circ} 44' \text{ W.}$ bottom was struck in 1080 fathoms; at 5 miles south of the Equator also 1080 fathoms; these two casts are respectively at 90 miles north and south of St. Paul's Isle. In $4^{\circ} 16' \text{ S.}$ and $28^{\circ} 42' \text{ W.}$ got bottom in 2100 fathoms; in $26^{\circ} 46' \text{ S.}$ and $23^{\circ} 52' \text{ W.}$ struck bottom in 2700 fathoms; this last sounding is important, as it is only 350 miles to the westward of a cast of 2426 fathoms, obtained by Captain Sir James Ross in the year 1839. In the Indian Ocean the casts obtained were 1400 and 1110 fathoms, near the supposed *Brunswick* and *Atalanta* Shoals, which do not exist; in $16\frac{1}{2}^{\circ} \text{ S.}$ and 59° E. got bottom with 1400 fathoms; in $5^{\circ} 30' \text{ S.}$ and $61^{\circ} 40' \text{ E.}$ bottom in 2254 fathoms, thus proving the non-existence of the *Rose*, *Galley*, *Swift*, and *Bridgewater* Shoals.

Ceylon.—Although no new surveys of this coast have recently been made, yet a valuable addition to the hydrography of this island arises from the publication at the Admiralty of two charts, on a scale of a quarter of an inch to the mile, extending from Colombo on the west, round the south coast, including the dangerous shoals named by the Portuguese the *Bassas*, and the east coast, comprising the rocks near Pigeon Island, off Trincomalee (where the *Ava* was recently wrecked), as far as Point Pedro. A new plan has also been compiled from various authorities of the harbour at Point de Galle. We do not know with whom it rests to make a complete survey of these coasts, but, whether it lie with H.M. Government or the East India Company, no time should be lost in setting it on foot, if we do not wish to hear of other losses in addition to that of the *Ava*, although it does not appear that that wreck was in any way the fault of the chart.

China.—In my last Anniversary Address I had the satisfaction of announcing to you that Captain Bate, R.N., the surveyor of Paláwan, was appointed to H.M.S. *Actæon*, for the examination of the coast of Tartary. Alas, how little do we know of the future! Hardly had he taken command of his ship, and prepared for his campaign, when

the assault on Canton was determined on. Foremost as usual at the post of danger, he volunteered for the hazardous task of selecting a site for the scaling-ladders of the storming party, and in doing so approached so near to the city walls that he was shot dead on the spot. Thus was lost to his country as zealous a surveyor, as gallant an officer, and as good a Christian as any in Her Majesty's service. He has left behind him in his works a monument more durable than brass. So long as the mariner's route to China lies along the coast of Paláwan, and that he can thread with safety that labyrinth of coral reefs that skirts its western shore, so long will the memory of this accomplished officer be held in esteem. In an unfinished letter to the Hydrographer to the Admiralty, found in his writing-desk after his death, Captain Bate says "he hopes soon to sail for the *Pratas*, at the south-eastern approach to the China Sea, to determine the best site for a light on that dangerous shoal, which has caused the wrecks of so many vessels." As the light on *Pedra Branca*, at the south-western entrance of the China Seas, is known by the name of HORSBURGH, whose Sailing Directory and Charts have long been the guide of the mariner in the East, so would it seem to be a fitting memorial to the gallant officer who has sacrificed his life in his country's cause, that the lighthouse, shortly to be erected on the *Pratas*, should be known by his name, and that the mariner, who, by a friendly beacon, is thus warned off that dangerous shoal, should be reminded of him whose last thought was for the sailor's benefit, and have cause to bless the name of THORNTON BATE.

Immediately after the capture of the city, our staff of surveyors under Lieutenant Bullock set to work, and have now completed a trigonometrical survey of Canton; and have finished what was formerly left undone of the chart of the Chu-Kiang, or River of Pearls, as far as Whampoa. They have also, under Mr. Frederick Kerr, made a track chart of the river to the west as far as Fatshan and Sam-shui.

Siam.—The chart of the Gulf of Siam has been materially improved during the past year. Messrs. Richards, Inskip, and Reed in the *Saracen* have again visited Bangkok, where, as before, they received every attention and assistance from the enlightened rulers of that country, the two Kings of Siam; they have completed a plan of the city and of the river Menam, which has been published at the Admiralty, and they have determined the position of most of the islands, as well as many of the headlands and capes on the

western, as well as on the eastern, shore of the gulf. A table of maritime positions, just printed at the Admiralty, and embodied in the latest edition of the chart of the gulf, will enable all map makers to correct the hitherto almost unknown outline of the coasts of that kingdom.

In *Australia*, a survey of Port Jackson has been made by the officers of H.M.S. *Herald*, and is in course of publication at the Admiralty; some additions also have been made to the approaches to Princess Royal Harbour. Here, and on Breaksea Island, lights have just been established as a guide to the anchorage for the Australian mail steamers, which at present all call at this port on their homeward voyage.

New Zealand.—Detailed coast charts of the entire circuit of this group of islands, the fruit of ten years' labour of Captains Stokes and Drury, with their zealous staff of assistants, on an uniform scale of 5 miles of longitude to an inch, or on an average scale of one mile to a quarter of an inch, 13 in number, are now engraved, as are also a complete series of the numerous ports and havens dotting the extensive sea-board.

Those singular arms of the sea, forming a network of harbours on the south shore of Cook Strait, one of them Queen Charlotte Sound, famous as the chief place of resort of the circumnavigator Cook, are being engraved on a scale commensurate with their nautical importance, and on their completion, by the close of the present year, it may be considered that the hydrographic features of New Zealand are fully delineated.

In *Vancouver Island* and in the Straits of Juan de Fuca, Rosario, and the Haro Channel, a survey is in progress under Captain Richards, of H.M.S. *Plumper*, ably seconded by his staff of assistants, Messrs. Mayne, Bull, Pender, and Bedwell; the Bay of Semiahmu has been examined, and the site of the recently discovered gold mines fixed at some 50 miles up the river Frazer. On the Oregon coast two charts, for which we are indebted to the U.S. Coast Survey of this region, from Diego Bay to Vancouver Island, have been published at the Admiralty; and in the Gulf of California, Captain Harvey, in H. M. S. *Havannah*, zealously assisted by Mr. Hull, Master R.N., has rectified the positions of various points of that little known coast, which have been inserted in the charts.

In the *River Plate* Lieut. Sidney, R.N., has completed a plan of Buenos Ayres and its roadstead, which has been published; while

the results of the reconnaissance by Capt. Page, of the U.S. navy, in his ascent of the Paraguay and Paraná, published in America, have been immediately re-engraved and published at the Admiralty, in connexion with the former labours of Captain Sullivan, for the benefit of merchants and others desirous to open a trade with that rising and fertile country. New charts of Bahia and Rio de Janeiro, in Brazil, on a sufficiently large scale, from surveys by various naval officers, have also been recently published.

The position of that dangerous coral reef *As Rocas*, lying off Pernambuco, has been redetermined by Commander Selwyn, in H.M.S. *Siren*, and found to be in lat. $3^{\circ} 51\frac{1}{2}'$ s. and long. $33^{\circ} 50'$ w., just 100 miles from the Island of Fernando Noronha, which agrees very nearly with the position assigned to this islet by Lieut. S. P. Lee, of the U.S. navy. A beacon, 33 feet high, painted black and white, has been erected on the western island; and some cocoa-nut trees, planted in 1856 by Capt. Parish, are growing.

The attention of the astronomical world is just now greatly attracted towards this portion of South America, inasmuch as the total eclipse of the sun of Sept. 7 will be visible in that country. The path of the shadow of the eclipse, about 30 miles in width, will reach the continent on the Pacific side, a little to the southward of Payta in the state of Equador, in about 5° south lat., and curving in a s.e. direction across the interior of the country, will quit the coast near Santos, in Brazil, in lat. 25° s. nearly. Perhaps the best position for seeing it will be from the summits of the coast range of the Andes, near Payta, shortly after sunrise on the morning of the 7th of September. It is with much gratification that I am enabled to add that the Admiralty, in the interests of science, have placed a steamer at Rio de Janeiro at the disposal of any *bond fide* astronomer who may be disposed to observe this rare phenomenon on the coast of Brazil. On the shores of the Pacific such aid is not necessary, as the regular mail steamer from Panama to Chile always touches at Payta.

West Indies.—In this archipelago of islands, perhaps the most important work during the past year is the publication at the Admiralty of a chart of the island of Cuba, in two sheets, on the scale of one-tenth of an inch to a nautic mile. It is compiled partly from the surveys of Captains Owen and Barnett, R.N., but principally from the Spanish charts, corrected by the maps of Pichardo and Coello. Lieut. Murray, in H.M.S. *Skipjack*, has also recently furnished some positions on the south coast. The above is only a

compilation, and confessedly imperfect; but there is little doubt but that it is far better than anything else that exists. It may be hoped that before long we may be enabled to improve it.

The survey of the island of Santa Cruz, by Messrs. Parsons and Dillon, is on the eve of publication, as is also a chart from St. Domingo eastward to Dominica, including Porto Rico.

United States.—Twelve sheets of charts and plans of harbours on the east coast of the United States of America, for which we are indebted to the admirable Coast Survey now so far advanced under Professor Bache, our medallist, have been published during the past year; they include the Delaware River, New York Bay, New London, and other places, the names of which, owing to the constant intercourse between the two nations, are familiar as household words.

Nova Scotia.—In the Bay of Fundy, Commander Shortland, with his staff, composed of Messrs. Scott, Pike, Scarnell, and Mourilyan, have surveyed the coast of New Brunswick from Quaco 25 miles easterly to St. Martin's Head, also from Cape Chiguecto to Cape Sharpe 25 miles, and from Port George to Cape Split, on the Nova Scotia territory, about 40 miles; they have also sounded over a space of about 300 square miles. Four sheets of the Bay of Fundy survey, on a scale of one inch to a mile, have been published during the past year.

On the eastern part of Nova Scotia and Cape Breton, Commander Orlebar, and his assistants Messrs. Hancock, Des Brisay, and Carey, have surveyed about 50 miles of sea and lake coast, including Great Bras d'Or, &c., sounding over 680 square miles. Two coast sheets and three plans of harbours, including Country Harbour, Whitehaven, and Miramichi Bay, have been published in the past year.

Variation Chart.—In continuation of the lines of equal magnetic variation, which have already appeared on the Atlantic, Indian, and Pacific Ocean charts, a Variation Chart of the World, to embrace this information so useful to the seaman and traveller, is being prepared for the present epoch by Mr. Fred. Evans, R.N., chief of the Compass Department at the Admiralty. It will comprise numerous observations recently made by various officers in H.M. navy, who have shown much assiduity in collecting materials. Of these we may especially mention an extended series made by Captain Richards and his assistants in the *Plumper*, on her voyage to Vancouver Island; by Mr. J. Loney, master of H.M.S. *Calcutta*,

on her voyage to India and China; by Captain Ryder, in the *Dauntless*, in the Mediterranean; by Captain Otter, in the *Baltic*, North Sea, and Hebrides; and generally by all officers engaged in the surveying service. These observations, after the variation chart of the world is published, will be printed, so that those interested may be enabled to examine the data on which the chart is founded.

Besides the works above enumerated as in progress in different parts of the world, the labours of the Hydrographic Office during the past year have consisted in the publication of upwards of 80 new or corrected charts of various coasts, and plans of harbours; of annual lighthouse lists for all countries, compiled by Commander Dunsterville, R.N.; of notices to mariners of new lights, or changes in them, prepared by Mr. G. Marsh, R.N., 1000 copies of which are weekly distributed; of tide tables, with daily predictions for 24 home ports, with the time and height of high water on full and change, for the chief places on the globe, computed by Mr. J. Burdwood, R.N., 1250 copies of which are distributed and sold; of various hydrographic notices of new rocks and shoals discovered, of maritime positions recently determined, all of which contribute materially to the benefit of navigation and the advancement of our knowledge of the physical geography of the globe.

Ordnance Survey.—During the last year the Ordnance Survey has been subjected, as I am informed by its able superintendent Colonel James, to another of those interruptions which for many years past have so marked its progress. In 1856 a committee of the House of Commons recommended that the series of plans which the National Survey should produce should, as respected Scotland, be—

1. Plans of Towns on the $\frac{1}{5000}$ scale, or 42 feet to an inch.
2. Plans of Parishes on the $\frac{1}{25000}$ scale, equal 25 inches to a mile, or 1 inch to 1 acre.
3. Plans of Counties on the scale of 6 inches to a mile.
4. Map of the Kingdom on the scale of 1 inch to 1 mile.

During the year 1856–7 that series was in the course of rapid production and publication, when the House of Commons decided that the larger plans were to be discontinued.

Seeing that by Colonel James's recent introduction of photography the plans on the larger scales can be so economically and rapidly reduced to the smaller scales, whilst the extra cost of plotting the survey on the 25 inch scale instead of the 6 inch is so trifling in amount, the last Government advised the appointment of a Royal Commission, composed of men eminent in science or public affairs,

to inquire into and report upon the whole question of the scales of the survey; the members of the Commission having been Lord Wrottesley, the Earl of Rosse, Lord Brougham, the Lord Justice General, Vice-Chancellor Turner, the Astronomer Royal, the Right Hon. E. Cardwell, Sir Richard Griffiths, General Cameron, Mr. Brunel, and Mr. Vignolles,

It is to be hoped that the Report of these Commissioners, whatever it may be, will be adopted by Parliament, and considered a final settlement of this long vexed question.

The progress of the survey during the last year has, I regret to say, been greatly retarded in consequence of the reduction in the amount of the grant to the extent of 30,000*l.*, and the necessary discharge of upwards of 1000 surveyors and draftsmen.

In England, however, the publication of the large plans of the county of Durham is nearly complete; those of Yorkshire and Lancashire having long since been published. The survey is now proceeding in Westmoreland, Northumberland, and Cumberland: a large portion of each of the two former is already drawn, and will be shortly published; and as the surveyors have now got through the great manufacturing towns and the populous mining districts, and have the more open country before them, a much more rapid progress may be confidently expected, and the completion of the survey of the northern counties may be soon anticipated.

In Scotland, with the exception of a small portion of Lanarkshire and Roxburghshire, the survey of the following counties is complete: Edinburgh, Haddington, Linlithgow, Renfrew, Ayr, Dumfries, Berwick, Selkirk, Fife, Kinross, Lanark, and Roxburgh; and the work is proceeding in Forfarshire, Perthshire, Stirlingshire, and Dumbartonshire. In fact, with the exception of the narrow strip of country along the eastern borders of Scotland to the north of Aberbrothick, the greater part of the cultivated districts of Scotland has been surveyed and drawn either on the large scale of 25 or that of 6 inches to a mile.

The plans on the 6 inch scale are now immediately reduced to the 1 inch scale, and engraved, and I still hope, therefore, to see, in my day, the greater part of our country represented on a map properly so called. Several of the sheets of England and Scotland have been published during the last year, copies of which are in the Society's Map Office; and I beg specially to direct the attention of the Members to the manner in which the features of the ground have been delineated on the Edinburgh sheet, and also

on the Yorkshire sheets. I have been indeed much gratified to learn, that the point for which I have long contended is to be carried out, and that the vast and uncultivated area of the Highland mountains of Scotland is to be represented, when published, on the 1 inch scale only.*

In Ireland, two-thirds of the 1 inch map has already been engraved in outline, and more than one-third of the features of the ground has been sketched. The entire map in outline will probably be finished next year, and the engraving of the perfect map with the hill features is in progress.

British Publications.—At the head of the new geographical publications of our country I naturally place the new edition of the work on Physical Geography by Mrs. Somerville, which was last year announced as forthcoming. The varied phenomena of the physics of the globe are, as in the former edition, most logically and clearly put together by this gifted lady, whilst many new and important data are added; thus affording clear evidence that nothing has escaped her penetrating eye; her sound judgment and accomplishments enabling her to condense into a few lines passages descriptive of the great truths of nature. In short, for clearness of method, perspicuity of thought, and vast range of subjects, Mrs. Somerville's 'Physical Geography' must call for our warmest approbation.

The 'Letters from High Latitudes' by Lord Dufferin, which have appeared in the past year, constitute a volume of a very different character. The dashing and spirited manner in which my noble young friend sailed forth on his enterprise, and his gallant bearing when with his little *Foam* yacht he was so fortunate as to traverse icy seas, from which the *Reine Hortense* steamer, conveying Prince Napoleon, was obliged to turn back, the ardour with which he explored the lonely Isle of Jan Mayen, are all enhanced by the unaffected, captivating, and modest manner in which these feats are recorded. I rejoice, therefore, in the accession of Lord Dufferin to our body of working geographers.

Of Mr. Atkinson's remarkable labours in exploring such vast tracts of Eastern Siberia and Chinese Tartary I had occasion to speak at our last Anniversary, when we first saw his striking sketches and paintings. In the mean time, by the publication of an admirably illustrated volume, he has so far made us familiar with

* See Journal of Royal Geographical Society, 1852, vol. xxii. President's Address, p. xc.

countries of great sublimity and wildness, as to incite geographers and naturalists to encounter the many obstacles which our countryman overcame, and bring us back accurate details respecting regions of which we, as yet, know little more than the mere outlines.

Although connected incidentally only with our subject, a work has recently been published which it would ill become me not to notice. The brilliant orator and elegant scholar who has given us his thoughts on the writings of the greatest poet of antiquity, has well said that "To pass from the study of Homer to the ordinary business of the world, is to step out of a palace of enchantment into the cold gray light of a Polar day:" for, whilst we may doubtless plume ourselves on our present geographical knowledge, when compared with that of the author of the 'Odyssey,' as delineated in the map attached to the volumes of Mr. Gladstone, we are forced to admit that whilst the moderns have made great and useful discoveries, and have vastly extended the domain of science, Greece, small as was her territory, has left behind her examples of the sublime and heroic, which, whether they be read of in the philosophic pages of Grote, or in the eloquent passages of Gladstone, have scarcely, if ever, been equalled by any succeeding nation.*

Among practical consulting works and maps the following may be noticed. Blackie's Imperial Atlas has reached its twenty-seventh part, and is expected to be completed in the current year. It will then comprise a hundred separate maps, to which reference will be facilitated by an extensive index now in course of preparation. Mr. A. Keith Johnston has prepared a new General Atlas comprising a complete series of Modern Maps, of imperial size; five wall Maps of the present geography of Europe, Asia, Africa, America, and Australasia. Europe, the first of this series, is to be published immediately. Also a Geological Map of Scotland, by Professor James Nicol, which will be published in June, will contain a vast number of new data, as brought together by my distinguished geological associate.

An improved form of Fullarton's Gazetteer of the World in 1855 is now before the public. The Royal Atlas of Modern Geography has in its publication reached the 16th part, and will be completed in 22 parts. A recent map, showing at one view all the British possessions throughout the world, presents some features of novelty,

* 'Thoughts on the Study of Homer,' by the Right Hon. W. Gladstone, M.P. 1858.

particularly in the manner of overcoming the difficulty of representing so large a portion of the globe as one extended hemisphere, in the manner devised by Colonel James, R.E. The catalogue of the 'Literature of Geography' reaches to the completion of classified works on Africa. This collective view, furnished under the title of a 'Geographical Notice' by Dr. Norton Shaw, meets a great desideratum in the science. Of the numerous new maps or improved editions of older Surveys issued and prepared by our indefatigable associate, Arrowsmith, I will not now speak, as those who wish to study or possess such excellent works know that they have only to repair to Soho Square.

CONTINENTAL GEOGRAPHY.

Russia.—*The great Russian Measurements of the Arcs of Meridian and Parallel.*—The great Russian measurement of the arc of the meridian between the mouths of the Danube and the shores of the Polar Sea, to which I directed your attention in 1845, is fully described in the work by F. G. W. Struve,* my eminent associate of the Imperial Russian Academy, and superintendent of the observatory of Pulkowa.

The progress of this measurement, one of the grandest geodesical operations of modern times, I formerly noticed up to the year 1845, when explaining the operations in Livonia, Vilna, Finland, and up to Tornea, the point, it will be remembered, which was the southern termination of the measurement of the arc by Maupertuis.

In 1850 General Tenner had the satisfaction to push his triangulation as far as the banks of the Danube, and thus conclude his highly creditable labours of 34 years' duration.

As the former measurements of the arc of the meridian in Lapland, by Maupertuis, and afterwards by Svanberg, do not correspond with the requirements of the age, it naturally appeared desirable to extend the Russian operations through Sweden and Norway towards the North Cape. For this purpose Struve obtained the cooperation of the Swedish Government; and thus the whole of the arc of

* This work is entitled 'Arc du Méridien de 25° 20', entre le Danube et la Mer Glaciale, depuis 1816 jusqu'en 1855, sous la direction de C. de Tenner, Lieutenant-Général de l'État Major Impériale de Russie; N. H. Selander, Directeur de l'Observatoire Royal de Stockholm; Chr. Hansteen, Directeur du Département Géographique Royal de Norvège; F. G. W. Struve, Directeur de l'Observatoire Central Nicolas de Russie. Ouvrage composé sur les différents matériaux, et rédigé par F. G. W. Struve. Publié par l'Académie des Sciences de St. Pétersbourg.'

meridian was extended to one of $25^{\circ} 20' 8''.2$, reaching from Ismail on the Danube to Hammerfest on the northern shores of Europe. The length of this line, according to Struve's calculations, amounts to 1,447,786.78 toises. The chief meridian of the whole arc is that of Dörpat, which was accurately connected by chronometrical expeditions in 1854 with Pulkowa; the latter place having been previously connected by Struve in the years 1843 and 1844 with the observatory of Greenwich. The longitude of Dörpat Observatory thus obtained is $1^{\text{h}} 46^{\text{m}} 53^{\text{s}}.53$ east of Greenwich.

One of the results of these operations is the very exact determination of a line of altitudes through Europe from South to North; and not the least striking fact among them is, that the Black Sea, the Baltic, and the Polar or North Atlantic Sea at Hammerfest, occupy exactly the same level.

Not less interesting is the Russian measurement of the arc of parallel or latitude extending from Bessarabia in the west, to the mouth of the Volga on the east. Of this work very little is known out of Russia; but the following reliable remarks have been furnished by Mr. Petermann, who obtained them from correspondents in that country. The mean parallel of these measurements is that of Züganeshst, or $47^{\circ} 30'$ North latitude, extending from Bessarabia, west of the Dniestr, by Vosnezensk on the Bug; Ushkalka on the Dniepr to Melekhovsk on the Donetz; thence it turns more towards north-east, reaches the left bank of the Volga at Sarepta, and extends along that river as far as Astrakhan. The elevations of this line are of great interest: from Züganeshst, which is 1004 feet above the sea, the ground gradually descends as far as the Dniepr, on which Snamenka has an altitude only of 223 feet. Between this point and Kuznetsow the country rises to 825 feet at Medwäd, and beyond Kuznetsow presents a general level of 400 to 560 feet, till at Sarepta it suddenly descends from 427 feet to 63 feet, which remarkable descent was already shown by myself and colleagues in our work on the Geology of Russia. The line of measurement along the Volga first descends *below* the level of the Black Sea at Prishivinsk. This work being in connexion on the west with the Trigonometrical Surveys of Austria, Prussia, and France, the determination of a very considerable arc of parallel between the Atlantic shores and the Caspian Sea is thus established.

Along with these operations may be mentioned the recent conclusion of a very important line of trigonometrical observations extending from Stavropol across the Caucasus to Tiflis, Bayazid,

and the Araxes; and another line from Astrakhan to the mouth of the Terek, Danaya-bashi, and the mouth of the Kur. A comparison of the altitudes of these two lines is curious; for while all points of the Astrakhan line, as far as the mouth of the Terek, are below the level of the ocean, the former line passes over the Elbrus, 18,604 feet, and the Great Ararat, 16,965 feet above the sea respectively.

Imperial Geographical Society of Russia.—Under the Presidency of the Grand Duke Constantine, the Vice-Presidency of that eminent navigator Admiral Lütke, and aided by the zeal and intelligence of its Secretary M. Lamansky, this Society is truly the centre of many of the best scientific explorations of Russia; whilst by its activity we can best measure the remarkable progress of geographical knowledge in this vast empire.

The most important of its recent labours is the exploration of Eastern Siberia, commenced in 1854, and to which I alluded last year. This great work is still in progress, and will probably be completed this year. The vast region beyond the Lake Baikal, and in particular the north-east angle formed by the course of the river Lena and its affluent the Vittim, being a country very slightly known, most attracted the attention of the members of the expedition; whilst other explorations were also extended to the south-eastern frontiers of Siberia, and particularly to the course of the great river Amur. By the arrangements for the survey of the Trans-Baikalian tract, M. Smiriaguin explored the valley of Vittim from its central part to the Lena; M. Ussoltzoff visited the valley of the Nertscha and the superior course of the Vittim; whilst the course of the Bargousine in Northern Angara and its affluents was to be traced by M. Orlof. The object of this expedition was not only to develop the physical geography of this region, but also to collect natural history products and ethnographical materials; the members of the expedition being directed to acquaint themselves as far as possible with the domestic life of the nomadic population, and with their means of subsistence and of communication. At the end of 1855 two of the members (Ussoltzoff and Orlof) returned to Irkutsk with successful results; but Smiriaguin, whose mission was the most important, was assassinated, and all his collections lost—a deplorable event, which deprived the expedition of some of its most important results. Again, it unfortunately happened that the destined successor of Smiriaguin, M. Sondhagen, died of apoplexy before his departure for Siberia. But, notwithstanding such untoward circumstances, some results of the expedition are very inter-

esting. Lieutenant Ussoltzoff presented to the Society the journal of his travels from the mouth of the Nertscha to the mouth of the Bargousine, embracing about 1500 versts. He determined the geographical situation of the principal points, and collected valuable information about the nomades of Olekma and Karenga.

Lieutenant Orlof also presented his itinerary, embracing about 2500 versts. It would be premature, says M. Lamansky in his memoir of 1856, to construct on these data alone a map of the valley of the Vittim, before the longitude of the river is determined. Nevertheless, if we compare the new sketch maps, prepared by the travellers, with the old maps, we observe some important changes. Thus, the sources of the Nertscha Yablonoi-Krebet were not ascertained before, and the neighbourhood of the Lake Baountof was totally unknown. It can now, however, be said that the geographical positions of all the principal points of the Trans-Baikalian district are determined.

Among these researches, the natural history descriptions and collections of M. Radde are fraught with deep interest. Commencing his observations in 1855, in the basin watered by the Lower and Upper Angara rivers, which fall into the Lake Baikal, M. Radde also explored the borders of that internal mass of water which are now rendered familiar to us by the striking paintings of Atkinson. The following year (1856) was entirely devoted to an examination of a region extending along the frontiers of China, from the Yablonoi mountains by the Argon river, a tributary of the great Amur. In this long tour he made zoological and botanical excursions into the elevated mountains of Tchokondo, the steppes of Abbagaitouy, the Lake of Torey, and the environs of the Dalai-Nor Lake.

In the tracts which surround the alpine Tchokondo, he observed that the vegetable products and animals occupied six distinct regions or terraces, from one of which, and at a height of 8200 feet, he collected many curious species of plants and rare animals. On the Lake Torey he watched the autumnal migration of the birds, and gathered the plants of a great adjacent saline steppe. Noting the periods of hybernation and reanimation of certain quadrupeds, M. Radde has further shown that, since the journey of Pallas in 1772, the herds of that remarkable animal the *Aegoceras Argoli* of the great naturalist, which then abounded in the mountains of Odon Tchalou, in Dahuria, have recently (1831) been entirely destroyed by a severe winter in the mountains of Sektui and Sehir, to which

they had migrated south-westwards; their skeletons now only remaining.

When the vast collection of animals and plants was gathered together and exhibited at Irkutsk, M. Selsky, who examined it, declared that, with the exception of Middendorf, Maksimovitch, and Schrenck, no traveller in Eastern Siberia had equalled M. Radde in the number and diversity of the objects collected; whilst the zoological and botanical maps which he has prepared in illustration of his researches may well be cited as proofs of his powers of generalization by enabling us to compare his data with those of Pallas, and thus measure the amount of change in the productions of nature which has taken place during the last 85 years in a region so little frequented by man, and where nature, untrammelled by artificial appliances, reigns supreme.*

The naval officers and astronomers of the expedition directed to the river Amur, determined the principal bends of the river, and most important results for natural history science were obtained by M. Maak and the other members of the expedition. By their combined labours the maps of the course of the Amur were prepared. All the materials for the natural history of the country were collected and presented to the Imperial Geographical Society by M. Maak, and are about to be published in St. Petersburg.

Both these great Russian explorations are still in progress, and a list of all the astronomical observations, both on the Amur and in the Trans-Baikalian province, is given in the Report of the Imperial Geographical Society of 1857. This list enumerates 115 points, principally along the banks of the Amur and its great affluents. All the most important places of this great river and its general configuration are, in short, made known, and these determinations will serve as solid bases for preparing the map which is to accompany the publication of the results of the exploration of the highly interesting basin of the Amur.

M. Semenoff, creditably known as the translator of the excellent work of Ritter into Russian, has been furnished by the Imperial Geographical Society with the means to explore the Russian Altai and the adjacent Kirghis deserts, already brought to the mind's eye of the British public by the paintings of Atkinson. The Russian work will thus acquire an originality of character by its copious additions.

* Bull. de la Soc. Imp. des Naturalistes de Moscou, 1857. No. 1, p. 296.

No scientific traveller (as M. Lamansky writes to me) had previously visited the Thian Chan and Alatau beyond the river Ili. Hence M. Semenoff, following the advice of Humboldt, with whom he corresponded on the importance of explorations in Central Asia, decided to try to penetrate into the Thian Chan and to the southern shores of the Lake Issi-kul. His enterprise was crowned by success. He penetrated without difficulty to the mountains Santache, between the Karkara (affluent of the river Ili) and the Tiub, which falls into the Lake Issi-kul. Thence he continued his way among the armed and turbulent tribes of Kirghis of Little Bukhara, then at war with the Chinese government, and pursued his travels to the East in the valleys of Djirgalan and of the Terek; this last forming the southern shore of the Lake Issi-kul. Before he reached the middle of that lake, the traveller turned abruptly to the south and advanced between the masses of rocky mountains of the Thian Chan through the transversal valley of Zaoukinsk. There, he found those alpine lakes, which, covered with ice even at the end of June, form the exterior or north-eastern limit of the fluvial system of the Syr-Daria. In another excursion to the south-east, from the Santache mountains, M. Semenoff penetrated through the lofty pass of Kosh-Djar, and reached the springs of Sarydjaz, whence flows the principal branch of the Oxus.

Other labours of the Imperial Geographical Society have consisted in the publication of the general as well as detailed topographical maps of the government of Tver. The pecuniary resources of the Society seem, however, to be insufficient for the publication of maps of other provinces which are already prepared.

The two last volumes of the Society's *Memoirs* (vols. xi. and xii.) contain the very valuable memoirs of Helmersen and Pacht, who have shown the intimate connexion between geological phenomena and physical geography in their explorations of Central Russia from the mouths of the Western Dwina to the Samara, accompanied by new geological maps.

Let me here say that the Imperial Geographical Society has also taken an interest in the expedition to the Caspian Sea, conducted by the distinguished naturalist and geographer Baer, who has published some instructive articles on the fisheries in this sea. Another memoir of Baer explains his views respecting the desiccation of the vastly larger Caspian of former periods. But sound as are all the natural history descriptions of my eminent associate, few geologists, I apprehend, will agree with him that the waters of the

great tract which Humboldt termed "Aralo-Caspian" once stood at the high levels of much of the steppe limestone, which is filled with Caspian shells; but will rather agree with myself and associates, that the great areas of land which surround the present Caspian, and which now separate that sea from the Aral, have been elevated into their present position from a former great interior depression on the earth's surface.

Lastly I may mention a fact, brought to my notice by Professor Katchenofsky of the University of Kharkoff, and now in London, that each University in Russia contributes more or less to geographical science. For example, the professors of natural history undertake every year the explorations of the adjacent districts, and publish their accounts and memoirs. Again, in the University of Kiev there was established some years ago a permanent commission for the description of Western Russia: its publications now form many volumes, and contain the most important materials for the geography, geology, statistics, and history of the governments of Kiev, and the adjacent provinces of ancient Poland.

Germany—Austria.—The Imperial Geographical Society of Vienna is steadily pursuing its useful career in bringing together information from other countries, and in stimulating and encouraging detailed researches which open out a knowledge of the interior of the empire or its coasts.

M. Haidinger has furnished me with good news respecting the successful voyage of the *Novara*, and has also sent to me the copy of a letter from Lient. Maury to Dr. Scherzer, of that Austrian frigate, which contains so much of real interest to physical geographers, by throwing light on the currents and temperature of the sea, with good suggestions for nautical and physical inquiries, that I hope it will be published in the Proceedings of our Society.

The maps published and the geodetical operations executed in the last year by the Imperial Geographical Institute of Austria, under the direction of General A. von Fligely, are as follows:—Special Map of Bohemia, scale $\frac{1}{144000}$, sheets 2 and 14; Maps of various districts of Hungary, without the relief of the ground, scale $\frac{1}{288000}$; Map of the environs of Gloggnitz, including the railroad over the Semmering, the Schneeberg, and the Rax-Alpe, scale $\frac{1}{144000}$; a general Map of Hungary in $16\frac{1}{2}$ sheets, scale $\frac{1}{288000}$, of which 4 sheets are published; whilst a general map of Wallachia is preparing in 6 sheets on the same scale.

In carrying out the triangulation of the Tyrol from Innspruck to the frontiers of Bavaria and to the territory of Salzburg, the engineers have determined the attraction exerted on the plummet by some of the mountains. In relation to one point in the middle of the valley of the Inn, and in approaching 530 Vienna toises towards the northern range of mountains, the deviation of the plumb line was 5".7. In the opposite direction, or in nearing the more southern mountains, or the mass of the Tyrol, it was found that for the spaces traversed of 625 and 1333 toises, the corresponding deviations were 6".2 and 10" respectively.

The Austrian Navy have recently made extensive magnetical observations in the Mediterranean, some of the most important of which are due to Dr. Schaub, the Director of the Naval Observatory of Trieste, who has lately visited London.

Of other Austrian publications relating to our subject, the most important are a book on the general Geography of the Empire, by Dr. Schmidt and Professor Wachsmuth; Von Czörnig's comprehensive work on Austrian Ethnography, with a beautiful large map in 4 sheets; and Professor Franz Potter's work on Dalmatia, the most complete relating to that country which has yet appeared.

Other German Researches and Publications.—During the last vacation, when roaming through Germany, I did not fail to visit the well organized and thriving geographical establishment of Justus Perthès, of Gotha, and was much gratified in witnessing the ability with which it is conducted. I am indeed glad to inform you that the 'Mittheilungen,' of which I spoke so favourably last year, has now, as I am informed, a sale of 5000 copies per month—a fact highly creditable to the German public. Having long lamented that we are not sufficiently acquainted with researches relating to Germany, or works published by writers of that country respecting other lands, I requested Mr. Petermann, the intelligent editor of that useful periodical, to furnish me with some data, which I now lay before you.*

* Mr. Petermann has sent me most of the sheets of a Memoir about to appear in the 'Mittheilungen' on the Progress of the great National Maps and Topographical Labours of all European Countries, a highly useful work of reference. See also List of the "Principal Maps of Europe" in our own Map-room.

Among the works of general interest which have recently been published by Justus Perthès and Co., of Gotha, or are ready for publication, are the following (exclusive of the German edition of Dr. Barth's Travels):—Lieut. Van de Velde's large Map of Palestine, in 8 sheets, based on his surveys in 1851 and 1852, and other accessible materials. Along with this map is a comprehensive Memoir, with numerous tables of astronomical and hypsometrical observations, distances, and other data. In connexion with this map, Van de Velde and Dr. Titus Tobler have drawn a large Plan of Jerusalem, also accompanied by

During the past year several laborious investigations have been made to fix the exact altitude above the level of the sea of some central points of Germany, to serve as bases for a mass of hypsometrical data accumulated during many years, and also to set at rest the question of the levels of the Adriatic and Baltic seas. For example, Professor Bohm, director of the Observatory at Prague, has determined the altitude of that place above the Baltic at 99·37 toises, and above the Adriatic at 97·03 toises; the second part of his investigation, namely, that referring to the level of the Adriatic Sea, remaining, however, uncertain, whilst J. F. Julius Schmidt has fixed the height of the Observatory of Olmütz at 109·81 toises.

The Essay of Dr. Meyn on the Friederichs-Koog, an extensive piece of ground in Holstein, gained from the sea, is a notable addition to the history of the Coasts of the North Sea; and the most important works on Southern Europe are those of Professor W. Vischer on Greece in the year 1853, and of Professor J. Roth on Mount Vesuvius.

Of German travellers in Asiatic countries, Dr. Roth, to whom I alluded last year, must be specially mentioned; for his researches will throw much light on countries mentioned in the Sacred writings. One of his best results is his exploration of the Wady Akaba, the watershed or culminating point of which, between the Dead Sea and Red Sea, is ascertained to be at the salt-marsh Godiyán, about seven hours' travelling from Akaba, which is 113 English feet above the level of the Red Sea. Dr. Roth has also made interesting discoveries in natural history, and has noticed that the crocodile lives in the rivers Zerka and Diffeh (32° 35' N. lat.), a fact unobserved by former travellers. At present he is exploring the countries east of the Jordan.

a Memoir; both maps and memoirs being prepared and published in English, in consideration of the interest England takes in these countries, and also of the benefit accruing to their works from English researches. Another work, by F. H. von Kittlitz, 'Reminiscences (Denkwürdigkeiten) of a Voyage to Russian America, Kamtschatka, and Islands in the Pacific,' contains many observations on the zoology and physical geography of these regions. J. G. Mayr's Atlas of the Alps, containing the whole of Switzerland, is now published. This atlas comprises 9 sheets, and extends over all the chain of the Alps and its flanks, the author himself having, during many years, travelled over all this region. Another work relating to the Alps, by Professor Simony, of Vienna, represents in a series of landscape-pictures, highly finished and printed in colours, characteristic geological views of Alpine scenery. A Geological Atlas of Austria, by Franz Foetterle, in Vienna, is far advanced, and will soon be published. A Plan of Prague, and a Map of the surrounding Country, both by Professor Körsika, of Prague, are elaborately drawn and coloured on a system of contour lines, and are accompanied by a Memoir. A work on Earthquakes, in three vols., by Dr. Otto Volger, particularly on the Earthquakes of Switzerland, is nearly ready; whilst the Exploration of the Taurus, in Asia Minor, with Map and large Diagram of the Geographical Distribution of the Vegetation, is published by Kolsky, the botanist, who accompanied Russegger in his well-known travels.

Dr. Sandreczki has published an interesting work in three volumes of his journey to Mosul and Urumiyah; and H. Zollinger, many years resident in the East Indian Islands, has recently returned there and recommenced his labours, which formerly were mostly published in Logan's Journal of the Indian Archipelago.

Theodor von Heuglin's little work on a journey to Abyssinia, lately published at Gotha, and now in my possession, contains new matter on the western part of Abyssinia not visited by any other European. This author is the Austrian Consul in Khartum, and one of the most active and indefatigable travellers in Eastern Africa. A perusal of this work, so creditable to the enterprising traveller, particularly for the light which he throws on the zoology and botany of North-Eastern Africa, must be singularly gratifying to our countrymen; since the author describes and figures a very remarkable species of *Musa* of great size, with violet or purple coloured midribs of the leaves, which proves to be precisely the wonderful plant the *Ensete*, described by the great Abyssinian traveller Bruce.* This reproduction before the public of Europe of another of the many original observations of Bruce—observations which to the disgrace of our country were formerly to a great extent discredited—has, I am happy to say, received a still more complete confirmation whilst I write, by the growth of this very *Musa Ensete* to the height of 40 feet in the Royal Botanic Garden of Kew, by my friend Sir W. Hooker, who reared it from the seed sent to him by Mr. Walter Plowden, H.B.M. Consul at Massowah, Abyssinia, in 1853.

Mr. Petermann published last year in the 'Mittheilungen' a portion of the Diary of the extraordinary Hungarian traveller Ladislaus Magyar, of whom I spoke in the year 1853, and who has been residing for several years in Bihé, being married to a native princess. He has recently sent home a portion of his work and a detailed map of Benguela, intending to return to Europe in the course of this year and superintend the publication of this work, which is to appear in three volumes, with detailed maps.

A young savant, Albrecht Roscher, devoting himself to African studies, has produced a work on Ptolemy's Geography of Africa, in which he has attempted to show the correlation between the map of that geographer and the maps determined by the most

* Vol. vii. (8vo. ed., 1805), Appendix, p. 140, and Atlas, Pl. VIII. and IX. M. Heuglin makes no allusion to Bruce's description of the '*Ensete*.' (See Hooker's Journal of Botany, No. XC., p. 210; also note on Abyssinia in the sequel.)

recent researches and discoveries. The principle of Mr. Roscher's interpretation is said to be novel and convincing.

Mr. A. Zurbold, of Leipzig, has brought out a Biography of the lamented Australian traveller, Dr. Leichhardt, and also collected and edited many detached papers and letters of that explorer.

Professor Heller, who has been travelling for several years in Central America and Mexico, has published accounts of the province of Tabasco, and of the region of Orizaba, with map. He makes the heights of the Pic of Orizaba 16,602 Fr. feet, and of the mountain Popocatepetl 16,650 Fr. feet above the sea. Professor Burmeister of Halle, so well known to geologists by his work on fossil crustaceans, &c., who previously travelled in the Brazils, has during the last year been exploring Uruguay, the Pampas, and other portions of South America. A work in two volumes by Julius Fröbel contains a description of his travels and experiences in North and Central America during the years 1849—1856. Though not professing to be a scientific work, it contains, I am assured, much new and interesting matter. Two well illustrated quarto volumes relating to the United States of North America, by Balduin von Möllhausen, have been published. This author, with Lieut. Whipple and Jules Marcou the well-known Swiss geologist, was employed in surveys and explorations connected with the projected railroads to the Pacific. The chief interest of this work, however, consists in its ethnography. An useful work on Chile has been published in French by V. Perez-Rosales, the Chilean Consul at Hamburg.

Cosmos.—Lastly, in mentioning the recently published works of German authors, let me dwell somewhat more on the 1st part of the 4th volume of the 'Cosmos' of the truly illustrious Humboldt.

On this occasion the author quits the consideration of the heavens, so luminously expounded in his former volumes, and treats exclusively of telluric phenomena. The part recently issued consists of two main divisions, in the first of which he treats of the magnitude, figure, density, and internal heat of the earth, as well as of its magnetism. He then pursues his grand fundamental plan; and maintaining the connecting links which unite all telluric phenomena and the representation of the concurrent action of forces in a single system, he devotes the second division to those terrestrial phenomena which are attributable to the reaction going forward from the interior upon the exterior of the planet, or, in other parlance, "volcanicity." This great class of physical agencies is most skillfully elaborated under the respective heads of earthquakes, thermal

springs, springs of vapour and gas (salses, mud volcanos, naphtha flames), and volcanos. The last are described under various heads, in each of which the direct connexion between the *modus operandi* (whether in geological and pre-historic times, or in the present period) and the geographical outlines of the earth is admirably sustained, both from the vast range of personal observation of the author, and from the citation of all those who have studied such works of nature. Although it is impossible to do more on this occasion than stimulate my hearers to read this most instructive volume, of which an excellent translation (with lucid annotations) has been produced by our associate General Sabine, I may specially call your attention to the sketch of the geographical distribution of volcanos. Humboldt estimates that out of 407 volcanos, 225 have been in activity in very modern times; and of these, 198, or $\frac{7}{8}$ ths of the whole, lie within the great "Pacific Basin." One of the important generalizations which he is disposed to draw, from a consideration of their prevalent linear direction, is, that islands and coasts are richer in these outbursts, because, to use his own words, "The upheaval effected by internal elastic forces is accompanied by adjacent depression in the bed of the sea, so that an area of elevation borders on an area of depression, the limit between them exhibiting profound clefts and fissures."

After minutely examining the chemical and mineralogical characters of the rocks produced by volcanic action, and doing all justice to the new classification of volcanic rocks by M. Gustaf Rose, Humboldt concludes this volume by pointing out the importance and extent of the eruptions of molten matter through the great clefts or fissures above spoken of. "He has been led (he says) to entertain the conjecture that a not inconsiderable portion—perhaps, according to volume, the larger portion—of volcanic rocks have been emitted, not from elevated volcanic frameworks, but from a net-work of fissures, on the earth's surface, from which they have poured forth, often forming strata covering an extent of many square leagues."—(English Edition, Sabine, p. 448.)

In a conversation which I held with my venerable friend in Potsdam in September last, just as he was entering his 88th year, he explained to me some of these views with his accustomed clearness and freshness of description; and I then had the satisfaction to find, that in addition to the remarkable volume now issued, a second part would soon follow, in which all organic nature, from its earliest traces in sedimentary strata to the present day, will be exhibited in

harmonious correlation with the physical changes of the crust of our planet.

Switzerland.—To our praiseworthy correspondent, M. Ziegler of Winterthur, so well known for many beautiful maps of his native country, I am indebted for what we know of the progress of Geography in Switzerland. The geodetic and topographic surveys have been continued in the mountains on the north of the Canton of Tessin, and along that part of the chain of the Alps which includes the Cols of Lukmanier, the Little St. Bernard, and the Splugen. Detailed works have been executed in the environs of these passes, whilst triangulation is proceeding on the elevated points above Dissentis and the valley of the Vorder-Rhein.

The principal travels which have been executed during the past summer, were undertaken chiefly with a view to geological researches. Those of Dr. Heusser in the Valais were made in the vicinity of Visp—to observe the centre of a disturbance caused by alarming earthquakes, which have not yet entirely ceased. M. Heusser, being a Professor attached to the University of Zürich, has recorded his own remarks on the localities of those phenomena in a pamphlet* published by the Society of Natural History of Zürich. Chanoine Rion has also given an account of earthquakes experienced in 1855, from June to November.†

During the past winter meteorological observations were likewise made throughout all the extent of the central Alps; repeated luminous appearances having astonished the observers.

By reason of the uninterrupted advance of the works for railways in Switzerland, the number of exact hypsometric data is continually on the increase, and M. Ziegler will continue his communications relating to altitudes along these lines, and will also make us acquainted with the progress of each railway. The Polytechnic School publishes a journal‡ which may be called the scientific organ of that federal institute, and which will describe in detail every Swiss railroad.

Hypsometric charts have been multiplied; and as their utility augments in proportion as we become enabled to compare with accuracy the heights of different countries, M. Ziegler has transmitted to us an extract from a work which he is preparing for speedy

* Das Erdbeben im Visperthal im Jahr 1855.

† Sion, 1855.

‡ Schweizerische Polytechnische Zeitschrift, 4to., Winterthur, 1856, pp. 12.

publication, and which will be noticed hereafter in our own publications.*

France.—Through the Report of the 'Bulletin de la Société de Géographie' of Paris by M. Alfred Maury, one of the Secretaries of that Society, we learn that the 20th part of the Map of France by the "Etat-Major," on the scale of $\frac{1}{884000}$, has been issued. The Dépôt de la Guerre has also completed a reduction of it in 16 sheets, and on the scale of $\frac{1}{350000}$.

The Survey of Algiers is in progress, on scales varying from $\frac{1}{350000}$ to $\frac{1}{884000}$.

Availing themselves of their leisure hours at Rome, the French officers have completed a Map of the South-Eastern part of the Papal Dominions on the scale of $\frac{1}{800000}$, to which has been adjoined a Plan of Rome and its environs on the scale of $\frac{1}{200000}$.

In the neighbourhood of the French possessions in Africa, the officers of the Etat-Major have compiled a Map of the Regency of Tunis, founded upon the observations of M. Falbe; and another, with the assistance of Capt. Baudouin, of the Empire of Marocco.

M. Linant, so well known by his earlier exploits, has produced a hydrographic chart of Egypt, and a map of Etbaye, the country inhabited by the Bichari Arabs.

In addition to the mention of the labours of the Dépôt de la Marine in the last year's Address, we have to thank that office for numerous charts since presented to us, whilst MM. Delamarche and Ploix have completed a line of soundings between Port Vendres in France and Algiers. The late M. Vincendon-Dumoulin, in company with the distinguished surveyor Capt. de Kerhallet, has published a work entitled 'Etudes sur le Détroit de Gibraltar;' and in the second edition of the 'Etudes sur les Ports de l'Algérie,' lately published, a series of excellent charts has been presented, the execution of which does credit to M. A. Lieussou. Lieutenant A. Boucarut has prepared the nautical documents for the Manual of the Navigation of the River Plata; and Capt. A. Legras has published an excellent work, entitled 'Description des Iles et des Passages compris entre la partie N. de l'Île de Luçon et les Iles du Japon.' The work of our own Horsburgh on the Indian Seas, already rendered into French by Admiral le Predour, has received considerable additions from MM. Darondeau and Reille. From Captain Cloué we have a notice of the Sea of Azov, of which our associate

* Atlas hypsométrique, avec des éclaircissements.

Capt. Sherard Osborn gave us a description. In addition to the above, Capt. T. de Lapelin has made known his late surveys on the Pacific side of Central America.

On the west coast of Africa, France has taken possession of the territory of Dakar, opposite to Gorée; whilst Capt. Guillain has completed his work on the voyage of the *Duconédic* to the east coasts of the same continent in 1846-7 and 8,—the portion relating to Guiledi, Zanzibar, Meurka, Mombás, and the languages of the tribes on the coast, being of particular interest.

Italy.—Little has been done for the advancement of geography in any one of the Italian States to the S. of Sardinia and the Austrian territory.

The trigonometrical survey of the kingdom of Naples for example, commenced under the late General Visconti, has progressed slowly of late years, the number of officers employed upon it not exceeding twelve at present, who are now occupied in laying down the frontier line with the Roman States. Of the great map of the kingdom, on a scale of $\frac{1}{800000}$, the three first sheets, including Gaeta and the neighbouring provinces, are on the point of being published. They are beautifully engraved, having the principal heights marked. The whole survey of the kingdom, and on the same scale, will consist of 68 sheets. The Topographical department is also now engaged in bringing out a general map of the kingdom, on a scale of $\frac{1}{800000}$, in four sheets. Commander Marzolla, of the same department, has of late years published a series of maps of the different provinces, chiefly derived from Zannoni's map, but with the roads more accurately laid down, and rectifications from the later military surveys of each province have been inserted, with detailed statistical data regarding the population, productions, &c. Although indifferently lithographed, these maps will be found to be useful for the traveller, until the great trigonometrical map is completed.

AMERICA.

Arctic Regions.—A paper by the Danish author Dr. Henry Rink, M.D., has been read before our Society, commenting upon parts of the volume of the lamented Kane. One of the chief points on which he dissents from the opinions expressed in the work of the memorable American explorer is, that the Humboldt Glacier of the latter is not to be considered as the embouchure of the great fluvial icy system

which covers Greenland, but simply as being analogous to the other glaciers of that country, which he, Dr. Rink, had long studied, and on which he has written;—viz., separated masses, which, advancing from E. to W., launch or “calve” their bergs into a succession of fiords.*

The other subject on which the Danish observer is a critical opponent, is the northern extension of the map of Kane as derived from the hasty excursion of the ship-steward Morton. As this last point underwent an animated discussion, in which Sir G. Back, Captain Collinson, and Dr. Armstrong took part, I refer you to our forthcoming Proceedings for the conclusions at which they had arrived respecting the necessity of removing Washington Land some miles to the south, and will now only remark that not a word was said upon the occasion which could in any degree affect the noble and chivalrous character of Dr. Kane.†

Of the expedition sent out by Lady Franklin I have little to add to my last notice of its departure and arrival at Disco, nor is it probable that any other communication will be received until October. We have, however, the satisfaction of thinking that, under the experienced guidance of M^cClintock, our friends are at the present moment exploring that hitherto untouched land between Bellot Strait and the Arctic Magnetic Pole, whence they will follow up the steps of our missing countrymen; and though there are some who will not admit the existence of Peel Strait, and more who doubt the possibility of navigating it, there are yet to be found others who, considering how simply the bugbear of rounding Point Barrow has been dissi-

* See Journal Royal Geographical Society, vol. xxiii. p. 145.—ED.

† After these lines were penned, I received a copy of the ‘New York Times’ of May 6, in which it was announced that Dr. Hayes, the companion of Kane, had laid before the Scientific Association of New York a project for a voyage of exploration to the North Pole by proceeding beyond the limit of Kane’s researches. This bold project is founded on the observations of Dr. Kane and the author, who noted that the growth of the plants, as well as the stature of the natives of their farthest north, together with the great northward migration of birds, were indications of a gradual decrease of cold towards the Pole. Hence it is inferred, that the broad zone of greatest cold, or that of 78° N., being once traversed by a plan indicated, the party would reach an open Polar sea, and a probable temperature of 66°. If the revival of the question of a Polynia should be followed up by an expedition sent out on such scientific grounds, we must truly thank our Transatlantic kinsmen for such a labour of geographical love.

Referring to the discussion which took place when Dr. Rink’s memoir was read, let me here say that I have had great pleasure, whilst this Address was going through the press, in finding that Professor Bache had come to very nearly the same conclusion as Sir G. Back, Captain Collinson, and Mr. Arrowsmith. This result being communicated to the Society at our last meeting of this session, together with friendly explanations, must have convinced Mr. Poor, the representative of the Geographical Society of New York, who was present, that nothing had transpired on the part of our countrymen, in relation to the voyage of Kane, which exceeded the bounds of fair inquiry among men who were seeking out the truth.—*June 25.*

pated, are not without good hope, that to the glory of establishing the fate of our missing countrymen, will be added that of the circumnavigation of America. At all events we may rest assured, that with the certain prospect of a secure retreat in the event of reaching the American Continent, Captain M'Clintock will strive to the utmost to get southwards in his vessel; so that with an experienced commander, a well-found ship, and an able crew, whose energies are directed to a well-known point, we may, under Providence, look forward to a successful result. Still it is not without reason that we are desirous to open a communication with him, and a fine opportunity is afforded to any enterprising person, like the noble author of 'Letters from High Latitudes.' Wager River or Chesterfield Inlet might readily be reached this season by such a vessel as the *Foam*, and the intervening tract of land between the gulfs and the estuary of the Great Fish River crossed in time to secure a retreat before the winter. Here would be the excitement of danger so frequently courted, together with the certainty of sport both for the rod and gun, and the prospect of aiding in the elucidation of that great mystery which has occupied the attention of the civilised world for so long a period!

I cannot quit the theme of Arctic researches, upon which I have long thought with intense anxiety, and on which I have dwelt so much at length at former Anniversaries, without expressing my obligations to our associate Mr. John Brown for his work entitled 'The North-West Passage and the Search after Sir John Franklin,' which he has dedicated to the Royal Geographical Society and myself. In this volume the philanthropic author—at all times in the front rank of those who have sustained the search after our missing countrymen, and who has never given way to despondency—has placed before the reader an able epitome of all the efforts which have been made, as well as the theories which have been formed on this engrossing topic. On his own part, he adheres to the simple view, that the gallant Admiral has been encompassed and held fast by adhering literally to his instructions, and by seeking to force his way in a south-westerly direction from Beechey Island. Not re-entering into this vexed question, which it is hoped M'Clintock may set at rest, and on which so many experienced Arctic authorities have written, some of them believing that, if such was his ultimate fate, Franklin first essayed to force his way northwards and reach an open Polar sea, we must admire the warm-hearted earnestness with which Mr. Brown has

acquitted himself of his task, and has placed before us in a compact form the services of so many of our Arctic heroes.

North America.—British Possessions.—In the Address of last year I entered somewhat into the details of the expedition which, under Palliser and his associates Blakiston and Hector, upon the recommendation of the Council, had been despatched by Government to survey the water parting between the basins of the Missouri and Saskatchewan rivers, and to explore the edges of the Rocky Mountains within our own territories. Since then we have received, through the courtesy of the Colonial Office, several communications conveying the information that Capt. Palliser reached San Josef, an American town seven miles from the British frontier. The bend of the Pembina river near that place is within the American territory; but it has been carefully surveyed, as a large portion of the river flows through British ground. After visiting Turtle Ridge, the expedition reached Fort Ellice, at some distance from which, coal of fair quality was found, and afterwards reached the Qui Appelle Lake, on which is situated the most western station of the Hudson Bay Company's traders. Thence, the explorers started for the Saskatchewan, and in the course of their journey were for the first time compelled to carry fuel with them. The river was found to be navigable for large boats from the point reached, 109° longitude, to Red River. From Fort Carlton, his winter quarters, Captain Palliser proceeded to Fort Pelly, and subsequently to Chicago, Detroit, and Montreal. The paper notices the different Indian tribes met with, the character of the country, the swarms of buffaloes, and the wholesale and indiscriminate slaughter of them by the Indians, and describes the resources of the country, and its adaptability for agricultural purposes. Guides and a party of men had been engaged to assist in the projected operations, and in the summer Captain Palliser intended to start for the south branch of the Saskatchewan, through the country of the Black-foot Indians. From Lieut. Blakiston the Secretary has heard that he had completed and sent the map of the route to Captain Palliser for transmission to the Colonial Office.

The magnetic observations of Lieut. Blakiston and the geological researches of Dr. Hector, from whom I have received very satisfactory reports, will doubtless prove valuable, and may be alluded to with more effect at our next Anniversary.

On that occasion also I trust it may be in my power to report good progress on the part of the survey which, under the command of our Associate Lieut.-Col. Hawkins, has proceeded to co-operate

with the American surveyors and soldiers in defining accurately, and if possible by marked physical features, the boundary between the British possessions and those of the United States lying to the west of the tracts explored by Captain Palliser, and terminating in the Pacific to the south of Frazer River and Vancouver Island.

As this last survey is accompanied by a clever young geologist, M. Bauerman, brought up under my direction, and who is specially versed in mineralogy, I look with great interest to his report of the structure of these hitherto slightly-explored regions, the mountains of which, whether the Cascade range near the coast or the great Rocky Mountains farther in the interior, are simply the prolongations of the two chief chains of the western waterpartings of New Mexico, California, &c.

The natural obstacles to the progress of such a party were, it was well known, the dense forests they must penetrate; and to these I learn, whilst I write, is added the discovery, which might also have been well anticipated in the prolongation of the Californian ridges, of so much gold in the banks of the Frazer river * as already to have caused numerous emigrants to rush to these new diggings; a course which I fear the working men of the American and British surveying parties may be too much disposed to follow.

Canada.—Report of its Geological Survey.—The Geological Survey of Canada, under the direction of Sir William Logan, has issued elaborate Reports, in two volumes, for the years 1853-4-5 and 1856, copies of which have been presented to the Society. A great part of these Reports is necessarily taken up with geological subjects. The first by Sir William Logan gives an account of a large part of the Lawrentian formation, which runs from the coast of Labrador to Lake Superior, forming along a large part of its course an important mountain chain, chiefly formed of gneissic rocks, equivalent to the oldest gneiss of the north-west of Scotland and of the Scandinavian chain. Among these rocks, between Lake Huron and the River Saguenay, there are many bands of crystalline limestone. The gneiss proper yields but an indifferent soil, while that derived from the limestones is exceedingly fruitful; the result being that in the gneissic district almost all the farms have been established on sinuous lines of limestone, which, now partly cleared, often penetrate far into the interior of the forest-covered Lawrentian chain.

* See the Californian newspapers, &c.

The exploration of fresh countries like large tracts of Canada, or the new territories of the United States, offers continual illustrations of the dependence of geology on geography; for the geologist is often obliged to map the ground topographically while conducting his own labours. Canadian rivers and lakes previously unknown have been thus laid down with precision, and many merely indicated before have been reduced on a series of maps which occupy 22 large plates, filling a quarto volume. These surveys were conducted by Mr. Alexander Murray, and embrace a vast tract of country between the north and east shores of Lake Huron and the river Ottawa. This territory is traversed by the river Myanatawan, which runs westward through a chain of small lakes, and empties itself into Georgian Bay, Lake Huron. Again the Muskoka river passes in a winding course of about 150 miles through a series of lakes to Burnt Island Lake, about half way between Lake Huron and the Ottawa. Near this point the Petewahweh rises, and flows north and east, emptying itself into the Ottawa at Upper Allumette Lake. On the north shore of Lake Huron large rivers of the same character are now for the first time accurately mapped, called respectively Spanish River, White Fish River, and Wahnapiatae River, which unites the lake of the latter name with French River, about ten miles from one of its mouths. This French River is of great geographical importance, uniting as it does by several channels the north shore of Georgian Bay of Lake Huron with Lake Nipissing, which is about 50 miles long by 20 in breadth. The eastern shore of Lake Nipissing is only a few miles distant from Upper Trout Lake, which, through the Mattawa river, communicates with the Ottawa in latitude $46^{\circ} 18' 12''$. It is in contemplation by the Canadian Government, if practicable, to construct a ship canal through these rivers and Lake Nipissing, so as to unite the Ottawa and Lake Huron. This would shorten the distance from the east to Chicago by 600 miles.

In the year 1856, on the same survey, an exploration of the island of Anticosti, in the Gulf of St. Lawrence, was made by Mr. J. Richardson. This island is about 140 miles long by 35 in breadth, and consists partly of Lower Silurian rocks, but chiefly of a series of limestones called the Anticosti group by Sir William Logan, containing as they do a suite of fossils somewhat peculiar and intermediate in character between those most characteristic of the Lower and Upper Silurian rocks, like those of the British strata to which I have assigned the term Llandovery rocks. Mr. Richardson walked

round the island, which is quite uninhabited, except at the light-houses. The coast is intersected by numerous streams, and a great part of it has a belt of reefs dry at low water, the outer edge of which forms a cliff from 25 to 50 feet high, that evidently constituted an old coast line when the land stood relatively to the sea at a higher level than at present. The south side of the island is generally low, but on the north it rises in a succession of ridge-like elevations to a height of from 200 to 500 feet above the sea. The country is covered with wood, chiefly spruce, varying from 8 to 18 inches in diameter, and from 40 to 80 feet in length. Besides this, it is reputed to bear "pines," poplars, mountain ash, cranberries, a species of gooseberry-bush, red and black currants, strawberries, species of peas, &c. Potatoes have been cultivated successfully on the south side of the island, also Timothy grass and clover, and Mr. Richardson observes that he saw half an acre of barley 4 feet high with a strong straw and well-filled ear. The wild animals in the island are black bears, the red, black, and silver fox, and the marten.

Canada may, indeed, well be proud of this survey, the great explorations conducted under the direction of Sir William Logan having added almost as much to our knowledge of the topographical and natural history characteristics of the country as of its geological structure.

Central America.—Reserving for our next Anniversary an account of the progress of geographical knowledge in the United States, let me now call your attention to a commercial enterprise which seems to afford a valuable opportunity for the extension of our acquaintance with a region hitherto imperfectly known. Of few portions of the world within the bounds of civilization is our knowledge perhaps more circumscribed than of Central America. It is stated by a recent traveller (W. V. Wells, 'Explorations and Adventures in Honduras') that even as respects the leading towns the true position of but few is given with any accuracy. A Company composed of influential persons, at the head of whom is that liberal merchant-prince Mr. W. Brown, M.P. (who munificently bestowed a great free public library and school upon the town of Liverpool), is about to construct a railway across Honduras, to establish a commercial passage between the Atlantic and Pacific Oceans. For the last twelvemonths this Company has had a numerous staff of engineers upon the ground. Struck with the importance of the project (for the direct distance is only 160 miles,

and the railroad it is estimated will not have a greater length than 180 miles), Her Majesty's Government have sent out Colonel Stanton, an officer of the Royal Engineers, to inspect the survey, which is now completed. A chemical geologist and naturalist (Mr. Kirkpatrick) is also proceeding to Honduras to explore the mineral wealth and physical geography of the country, and the productions and quality of its soil. There will, therefore, not long remain any doubt respecting the capabilities of Honduras. Already we know from the work of Mr. E. G. Squier, that its harbours on both oceans, and its natural valley from sea to sea, intersecting the Cordilleras by the courses of the rivers Humaya and Goascoran, point out this tract as a great highway of commerce. In anticipation of the good results which are likely to follow from this effort of British capitalists and the suggestions of Mr. Squier, let me add that, out of near 60 persons hitherto employed during a year in a tract which has been considered insalubrious, not one death has occurred.

Through our active associate, Mr. John Power, of Panamá, we have received notices of various works in progress bearing upon the geography of these important but still very imperfectly mapped countries.

Dr. Wagener, the German traveller, was by the last accounts at Panamá, proposing to devote some time to an examination of the geography of the isthmus.

Of Guatemala an entirely new map is preparing for publication by Mr. Van Gehucht, a civil engineer, who has spent eight years on a trigonometrical survey of this state, in which he has determined by astronomical observation the true position of all the principal towns, as well as of the leading physical features of the country. Our correspondent, Mr. Power, has sent us a portion of the positions so determined, which will appear in the next volume of our Journal. To him we are also indebted for the translation of the first part of 'A Description of the State of San Salvador,' by Mr. Sommenster, an engineer who has been employed in making a new survey of it for the Government, which will shortly be published. Costa Rica has been partially surveyed by an English Company from Port Arenas, on the Pacific, to San José, the capital, a portion of the isthmus said to be now very incorrectly laid down.

Mr. F. M. Kelley, of New York, well known as the originator of the proposed great ship-canal across the Isthmus of Central America *vid* the Atrato river, has sent to us the interesting report

of Lieut. N. Michler, in charge of the topographical party sent by the United States Government to survey that part of the country. Lieut. Michler announces to the Navy Department, that he has completed his topographical survey across the Isthmus from the Gulf of Darien to the Pacific, along the line for the interoceanic canal proposed by Mr. Kelley. The practicability of the route, says Lieut. Michler, can only be determined upon after the necessary examination of the results of those labours.

South America.—On the river Meta, an important tributary of the Orinoco, steam vessels have been established by a Venezuelan company, whereby an opening has been made into the very heart of the country for the outlet of the products of the interior provinces of New Granada.

A new map of the State of Ecuador has been completed, after many years' labour and study, by Dr. Villavicencio, a native, who proposes carrying it to Paris himself for publication.

In Chile an exploratory expedition has crossed the Andes into the Indian territory south of Valdivia, to examine the lake of Nahuelhuapi, the site of an old settlement of the Jesuits, supposed to be the source of the great Rio Negro, which crosses the continent, and falls into the South Atlantic in latitude 41°; the details of which are promised to be sent to us.

The long pending dispute between Brazil and Paraguay relative to the opening of the upper waters of the river Paraguay has been recently settled by an amicable arrangement throwing open the navigation, in virtue of which the products of the rich province of Matto Grosso may now for the first time be exported by water-carriage, and we may look perhaps for some new data regarding a vast region very little known to Europeans.*

ASIA.

Syria.—Pushing onward to the east and south in the Pashalik of Damascus, beyond the explorations of Seetzen, Burckhardt, Lindsay, Porter, and all previous travellers, Mr. Cyril Graham has, through the good will of that singular people the Druses, contrived to visit the very remarkable tracts to the east and south of the Hauran,

* The reader who may wish to obtain more knowledge on the subject of the various parts of America than I here allude to must also consult the works thereon by German authors.—*See ante*, p. 285.

called es-Safáh, el-Hárrah, and the whole eastern borders of the Jebel ed Druz. He has given us, in short, a most able and animated sketch of a region which, occupied successively in olden times by powerful and civilized races, is now a desert, over which wandering and predatory Arabs, almost alone, hold sway. The es-Safáh is a highly-broken basaltic district, which extends to the N.N.W. into a chain above 30 miles in length, not marked on any map. The el-Hárrah, on the contrary, is a broad lower zone of loose basaltic fragments, forming the western belt of the broad rich plain lying between the Hauran mountains and the river Euphrates. After a description of the physical geography of this long forgotten region, the author describes the position of numerous cities scattered over the desert to the east and south of the Hauran, which, though wholly uninhabited, and for the most part roofless, are in many respects as perfect as when the olden people lived in them. Agreeing with Porter, that the Hauran must be the ancient Bashan of Scripture, Mr. Cyril Graham believes that the towns lying to the east of it, and which he discovered, are of a still older date, and were probably the work of the first Hamite emigrants from Shinar. He also collected very curious inscriptions in an unknown character, which have not yet been deciphered.

In reviewing the adventurous and successful travels of Mr. Graham, of which we shall soon have a detailed account in our Journal, we painfully recognise the fact, that a once highly cultivated, richly wooded, and densely peopled country, which after the times of Holy Writ was successively occupied by Greeks, Romans, Christians, and Saracens, has been reduced to a desert, supporting only a few nomadic tribes of Arabs.

The desiccation of the country may in great part be attributed to the destruction of once stately groves of lofty trees, which attracted the clouds and moisture, as well as to the demolition of those great reservoirs of water which the ancients constructed; but we are forced to the conclusion, that the main cause of this wide-spread sterility is the misrule of ages, and the inability of the Turkish Government to protect any industrious and settled inhabitants from the incursions of lawless Arabs. In the mean time it is refreshing to know from Mr. Graham, that the persevering Druses, to whom he was so much indebted (and who now supply the indolent inhabitants of Damascus with nearly all their corn), are extending agriculture, with muskets over their ploughs, into the richest spots of this *terra incognita*, and are thus explaining to us how such lands may in

ancient times have fed and supported the people who dwelt in the vast number of deserted cities.

India—Himalaya, Karakorum, and Kuen Luen chains.—Résumé of British Labours in India.—At our last Anniversary one of our Gold Medals was justly bestowed upon Colonel Waugh for surveying and laying down on maps a vast area of the Peninsula of India, and for determining that the Himalayan range, the loftiest mountains in the world, reached their culminating point in Mount Everest at the height of 29,002 feet, considerably to the west of the point hitherto supposed to be their summit. On the same occasion I spoke to you of the recent travels of the three brothers Schlagintweit, particularly in Upper India, and the mountains to the north of it.

Unhappily there is too much reason to believe, according to native report, that Adolphe Schlagintweit, who was left exploring in the countries beyond Ladak, and far to the north in the direction of Yarkand, and from whom no letters have been received for more than a year, has fallen in an action with the Chinese, in their war against the people of Turkistan; the fruits of his enterprise being, it is feared, lost. As, however, the reports of the natives proved unreliable in the case of our excellent explorer Moorcroft, let us hope that Adolphe Schlagintweit may still be spared to bring home to us some knowledge of the Yarkand territory.

The other brothers, Hermann and Robert, have now deposited at the India House their manuscript observations, numbering 43 large volumes, accompanied by maps indicating the distribution of their 88 magnetic stations, numerous meteorological observations, including all those which they obtained from various officers of the Company, and the localities where their plants were collected.

A considerable portion of their collection has indeed been already set up in the Museum of the India House, including transverse sections of trees, and facial casts of the people among whom they travelled, which, being taken from the living person of races little known, must be of value in ethnographical science.

Geographers must desire to see the results of these labours published, not only as relates to terrestrial physics and magnetism, but specially by the production of a map, on which shall be laid down the northernmost of those explorations of which, on the authority of Humboldt, I spoke last year, and to which I now revert: for it is indeed unquestionable, that the Schlagintweits did proceed farther to the north and by east, in the meridian of Ladak, than any other European traveller.

As a resultant of the numerous surveys and travels of our countrymen who have explored northwards from Hindostan, I may remind you that the gigantic peaks which enclose the lofty plateau of Tibet, and separate India from Turkistan, have generally been considered by British geographers to constitute one vast mass, or sea of mountains.* They were indeed so spoken of when I had the honour of delivering our Gold Medal to Henry Strachey, one of the best surveyors of large parts of this rugged region. Concentrated upon the west, in a knot or group, at and around the Hindu Kush, these mountains expand thence to the east and south in fan shape, their southern portion, the Himalaya, being the loftiest elevations in the world, and forming the northern boundary of India. Farther to the north, and beyond the plateau of Tibet, comes another band of parallel altitudes, which, also proceeding south-eastwards from the lofty western knot, is known near that meridian as the Múztagh, and acquires, a little farther to the east, the synonym of Karakorum. This last range, which, still farther to the east, is the Kailas of British topographers (adopted from the Hindú mythology), has for some years been marked on maps as the watershed of the mountain region which separates the drainage of India from that of Turkistan and China.† It throws off to the south the Indus, Sutlej, and Brahmaputra; the two first, after wandering westwards, and the last eastwards, in the plateau of Tibet, escape southwards through gorges of the mighty Himálaya, whilst to the north it sends off minor streams, the western ones of which, from whatever authority derived, have been for some years laid down on maps as descending from these mountains into the north-western low country of Yarkand.‡

In alluding to this axis or waterparting, it is a fact that it has not been traversed by any European proceeding northwards from India, though I specially invited your attention to that adventurous journey of Dr. Thomson when he ascended to the summit of the Karakorum

* See Phys. Geography—Western Tibet; Journ. R. Geograph. Soc., vol. xxiii. p. 1.

† Called "Thsoug-Ling" mountains in St. Martin's map, accompanying Julien's Travels of Hiuen-Tsang.

‡ See Map accompanying Hügel's 'Travels in Kashmir,' prepared by Walker (small general part thereof), and Arrowsmith's General Map of Asia, 1841; also the Map accompanying the Travels of Moorcroft and Trebeck, published 1841—some of the materials for the northward drainage from the Karakorum having been doubtless those collected by Mir Izzet Ullah, the remarkable servant and *avant-courier* of Moorcroft, whose travels beyond the Himálaya, through Tibet to Yarkand, and thence by Samarcand to Bokhara, &c., were translated from the Hindu by Professor H. Wilson in the Calcutta Oriental Quarterly Magazine of 1825, and republished by the Royal Asiatic Society.

pass. The same chain was, however, passed over in its far eastern prolongation by those very remarkable missionaries Huc and Gabet, though, unfortunately, they have given us no materials by which we can define its orographical features.

Now, the feat of the brothers Schlagintweit, of which I partially spoke last year, was, that leaving the Karakorum to the south, they traversed a diversified and broken plateau of about 16,500 feet average above the sea, and of about 100 miles in breadth from south to north, when, reaching a depression extending from west to east, they found between it and the low country of Khotan, another parallel east and west range, one of the heights of which they determined to be from 19,000 to 20,000 feet above the sea.* According to these travellers, this is the Kuen Luen (a Chinese name) of Klaproth and Humboldt, and is so called by the natives. Leaving these mountains, and descending to Elchi or Ilchi, the Khotan of Marco Polo, in the lower country of Turkistan, they were unable to reach Yarkand, and then returned to Ladak by another route, or that which leads from the former to the latter place. The rivers which they mention as separately flowing northwards, and which they have personally examined, are those of Khotan, Karakash, Yurungkash, and Keria, two of which were engraved in Arrowsmith's map of Asia (1841), from a large Chinese map at the India House, brought home by Colonel Reeve.

I here, however, repeat what I stated last year; viz., that the Schlagintweits are the only geographers who have visited those localities. They sustain, in fact, the view of Humboldt, and affirm that his Kuen Luen presents all the characters, relations, and altitude of an independent chain, as laid down by that great geographer in his 'Asie Centrale.'[†]

In anticipation, then, of the publication of such maps as their very arduous and difficult journey enabled them to make (they being disguised as natives), let us willingly accord to these brothers (one of whom has, I fear, paid the penalty of his life for adventuring too far into those wild tracts) the merit of having penetrated so far northwards as Khotan. Let me add that their drawings and paintings—particularly those of some of the great glaciers—are most striking and effective.

* Mir Izzet Ullah makes the distance from the north face of the Karakorum to Yarkand between 120 and 130 hours of march, which he accomplished in a caravan in seventeen days.

† See Humboldt's 'Asie Centrale,' 3 vols. and Map. 1843.

In alluding, however, last year to other labours of these gentlemen, I much regret to have unwittingly attributed to them geographical results in the Kumaon territory which it is well known were mainly accomplished, more than thirty years ago, by the very able British officers of the Trigonometrical Survey of India; viz. Captains Webb, Hodgson, and Herbert.*

In that survey, those officers measured the altitudes of such a number of peaks averaging upwards of 20,000 feet, that references were made to them by numbers instead of by printed names, among which the No. 14, which is the Nundi-Devi of my last year's Address, was separately measured by Hodgson and Webb, the former placing it at 25,749, the latter at 25,669 feet—a striking proof of the concurrence of the independent labours of these hard-working and excellent geographers.

Again, the glaciers of the river Pindur are laid down in the same map, and Capt. R. Strachey, Col. Madden, and other British officers have carefully examined these glaciers since that time. In fact, the orography of the mountains between the Kalee and the Sutlej, including Kumaon, has long been known; though the Schlagintweits made some interesting additions to the physics and the pictorial delineation of these tracts.

Nothing could be farther from my thoughts than not to sustain the hard-won laurels of the many British subjects who have earned great scientific reputation in the Trans-Himalayan regions; and no one who has perused the 'Asie Centrale' of Humboldt † can doubt that he has striven to do honour to our Moorcroft and Trebeck, the brothers Gerard, and all our earlier explorers, whilst in subsequent

* See Sheet 66 of the Great Map of the Trigonometrical Survey of India, issued by Horsburgh, 1827. I have the more been called upon to correct this *erratum* in my preceding Address, and to register the antecedent labours of some of the many British geographers and engineers, in consequence of a document presented by the MM. Schlagintweit (in September last) to the East India Company, in which they specify all their intended publications, without referring to the labours of their numerous predecessors in the regions through which they travelled. This document, which was not intended for publication, unluckily found its way into a periodical, and naturally gave umbrage to those who thought that numerous observations of our countrymen were slighted. In justice, however, to MM. Schlagintweit, I must state that they have assured me of their having always intended to enumerate the labours of their predecessors, as well as to refer gratefully to all those persons who kindly aided them; and they claim to be not judged by a mere MS. announcement of *their own* researches.

† I speak only of what Europeans have done in the region under discussion; for besides what was done by Moorcroft's man, Mir Izzet Ullah (see p. 301), Major Cunningham has shown, in the Asiatic Journal of Bengal, that as early as the year A.D. 414 the Chinese traveller Fahia explored some of these mountainous regions; and in his translation of Hiuen-Tsang's Travels in India during the seventh century, M. Julien also mentions the knowledge which the Chinese had acquired of this country.

works, including those with which I have myself been connected, such as the volumes of the Geological and Geographical Societies, there has surely been no remissness in acknowledging the highly-important and original labours of several of these remarkable men.

For my humble part in bearing testimony to the deserts of my countrymen, I refer you to several of my Anniversary Addresses, but particularly to that of 1852, when, after presenting the Gold Medal to Henry Strachey for his arduous services in completing a map of Western Tibet, I specially spoke of the successful explorations by my countrymen of "that part of Asia to which, as Englishmen, we attach deep interest, as constituting the northern frontier of our Indian possessions, which geographers revere as the loftiest region of the earth, and which it has been the ambition of Humboldt through life to visit in person."

Nor need we go far back in scientific history to note that one of the greatest additions to the science of physical geography was made by our countrymen Hodgson, Herbert, Colebrooke, and others, who, despite the incredulity of European philosophers of mark, demonstrated that the Himálaya mountains were the loftiest in the world!

In here reverting to a few only of these men, let me remind you, that whilst Henry Strachey received our Gold Medal, his brother Richard justly obtained the admiration of geologists for his clear and faithful description of so large a range of the region on both sides of the Himálaya, including the territory of Kumaon. Most assuredly I never could be oblivious of the services of the man who had been the first to demonstrate the existence of Silurian rocks near the Himálayan axis! * I further endeavoured to bring to your mind's eye the researches, in regions never before visited by European naturalists, of Joseph Hooker in Eastern Tibet, and of Thomson in Western Tibet,† researches so well conducted in many branches of natural history, and particularly of botany, as to have won for them the admiration of all enlightened men.

Again, did not geologists and geographers, with whom I have been acting, long ago recognise with gratitude the real merits of our Indian explorers, Cautley and Falconer, when they put forth their remarkable description of the wondrous fossils of the Sewalik hills?—researches all the more striking and praiseworthy, since the authors not only defined a new range of elevations as

* Quart. Journ. Geol. Soc., vol. vii. p. 292, and vol. x. p. 249.

† Royal Geog. Soc., vol. xxii., President's Address.

perfectly separated from the Himálayan chain, but, when far distant from all the means and appliances of Europe, actually described forms of extinct vertebrata never before brought to light, and assigned to them their true places in the animal kingdom.

In mentioning the name of Falconer, I cannot but regret that a large portion of the researches of my valued friend have never been laid before the public. Thus, I have ascertained that in 1838 he crossed the mountains of Iskardo, and followed up one of the sources of the Indus by the valley of the river Braldo to about 36° N. latitude, on to the glaciers which hang upon the southern face of the Muztagh or Karakorum, afterwards explored by Thomson, and which there separate the great steppes of Tartary, and the affluents of the Oxus, from the drainage of the Indus. Assisting in measuring a base line in Cashmir, in company with the late Colonel Mackeson, he amassed a large collection of plants from the Muztagh range, Western Tibet, and Cashmir, Lower Affghanistan, the Salt Range, and the Punjab, which valuable accumulations are at length being examined at Kew, under the direction of Sir William Hooker and his son.

Such labours as these, and many unregistered data, deserve to be accurately chronicled among the feats of our exploring countrymen in India, as well as the labours of Jacquemont, Hügel, Vigne, Winterbottom, and others, which have been noticed in our Journal, and are well known to geographical readers.

But here let me observe, that the writer who would bring together the numerous observations of all observers and travellers in various parts of India, which are scattered through a variety of periodicals, would render immense service to science. Many of these labours, as far as they relate to botany, geography, and geology, including those of my lamented friend the adventurous Burnes, have been frequently brought under your notice, whilst those of the distinguished botanist Royle have been feelingly adverted to by my contemporaries in mourning over the recent death of that eminent man.

In relation to geology, many of you are well aware that much light has been successively thrown upon the sister science by the labours of a host of observers, besides those I have alluded to, in various parts of Hindostan, among whom the names of Sykes, Franklin, Malcolmson, Christie, Newbold, Vicary, Fleming, Carter, Buist, &c., are honourably enrolled.

Let me also add, that I entertain a most sanguine hope that, with the re-establishment of order, the geological survey of India

will, under the direction of Professor Oldham, be brought into a condition of great usefulness to the empire, whilst under his able guidance it cannot fail to evolve results of great interest to pure geological science, some of which are indeed already foreshadowed in materials forwarded by him, which are now under consideration in this country. Although it is not my province to dilate on geological subjects, it gives me real pleasure to state that, as Governor-General of India, Lord Canning has taken a warm interest in the promotion of geological science, both by the enlargement of the Geological Survey formed during the Government of Lord Dalhousie, and by the addition of a School of Mines, thus testifying his sense of the necessity of opening out effectively the mineral resources of the Indian empire.

China.—The political arrangements which are pending will, it is hoped, result in the opening out of this vast empire, and in obtaining for us a much better acquaintance with the geography of its interior than we now possess. It is possible, though not probable (considering the suspicious character of the Manchu, or reigning dynasty), that the negotiations of our Government may result in the residence of a British minister at Peking, and, if so, a field for geographical investigation will be opened in Northern China, a region hitherto little visited by any Europeans except the Russians, and in early times by the Jesuits. But if this effort should not be successful, the mere laying open to the enterprise of our merchants, of the great river Yang-tze-kiang, which waters the vast plain, in the centre of which lies the ancient capital Nankin, will obtain for us an acquaintance with the chief interior parts of China. It will, in a word, give us access not only to the town of Hankow, perhaps the largest mart for commerce in Eastern Asia, which, situated 500 miles from the coast, is accessible to ocean steamers, but also to all the sites of mineral wealth.

The importance of this river as the high road into Central China was recently pointed out to the Society in a memoir, equally instructive and judicious, by our associate, Mr. W. Lockhart, who had resided many years in the country as a medical missionary. According to this experienced writer, and the concurrent testimony of Mr. Consul Alcock, as well as of several naval officers, most signal advantages must follow from opening out this great water-course, which would bring Europeans into immediate commercial connection with the one hundred millions of people who inhabit its fertile banks and those of its affluents.

A remarkable circumstance connected with physical geography, to which Mr. Lockhart directed our notice, and one that will doubtless attract great attention, is the change which has taken place in the course of the Hwang-ho, or Yellow River to the sea. Instead of flowing to the south of Shantung, as formerly, this mighty stream has shifted its embouchure to the north of that promontory, falling into the gulf of Pih-che-le, 200 miles from its former mouth! This is one of the many proofs of the decline of vigorous government in China. In earlier periods the embankments of the rivers were carefully watched and repaired; but neglect has led to the breaking down of all artificial ramparts, and vast fertile tracts have consequently been sterilized.

Although unacquainted with scientific geography, and the relations between astronomy and geography, the Chinese possess, it appears, remarkable geographical and statistical accounts of the whole empire. A work called the Ta-tsing-yih-tung-che, one of many similar publications, enters minutely into the topography, locality, and limits of every province, city, town, village, and hamlet in the empire, and gives the minutest details regarding the population, products, commerce, and characteristics of the different places described.

Of all the recent donations made to our Library, no one has more gratified me than the offering of Mr. Lockhart, of the Te-le-tseuen-che, or a compendium of elementary geographical science, in two volumes in the Chinese language, as prepared by his associate, the Rev. W. Muirhead, and published at the expense of the late Mr. L. Dent, an English merchant. Translating the works of our most popular authors, and illustrating them with maps, diagrams, and drawings of animals, our good countrymen who have already issued two volumes,—one on political, the other on physical geography,—have thus taken the best method of breaking down the barriers which have so long separated us from this peculiar but most intelligent, ingenious, and laborious race.

Had it not been for the present troubles in China, much would have been accomplished in the survey of the coasts of Tartary and Japan. For that purpose H.M.S. *Actæon*, under the command of that deeply-lamented officer the late Captain Bate, was despatched from England last year, but having been detained before Canton, the object of her voyage was postponed. Besides the knowledge of the course of the great rivers, we have yet to obtain an acquaintance with the northern coast-line to the gulf of Pih-che-le and Leaou Tung, as also with the whole of the coast of Corea.

The Russians, as already stated, have long had intercourse with the northern provinces of China; in fact, their overland commerce with the Chinese is of far greater antiquity than our maritime trade with this people. Russia has also had, for many years, a religious establishment at Peking, which she has enriched of late by attaching to it various men of science, whether miners, geologists, or astronomers. Of the former, Major Kovanko, of the Imperial School of Mines, long ago published an account of the coal produce of the environs of Peking. M. Constantine Skatschkof, who has resided nearly eight years at Peking, as Director of the Russian Observatory there, and who, having recently returned to Europe, has just visited London, informs me that he has also prepared an account of those rich coal fields. Though not professing to be a geologist, this accomplished gentleman, having inspected the fossils of the Museum of Practical Geology, had no hesitation in recognizing among our British types, Silurian Graptolites and Orthoceratites, with Devonian Spirifers and Carboniferous Producti, as being forms which he had seen around Peking.

As a large collection of these remains will be brought to Petersburg next year by M. Vasilefsky, the medical officer of the Russian Mission, we shall know precisely the extent to which the same fossils extended from Britain to China in the palæozoic times. Already, indeed, we may feel pretty certain that such a diffusion of similar types prevailed; for Mr. Lockhart has furnished me with fossil shells from the interior province of Sze-chuen, which are identical with species of Devonshire and the Boullonnais.

Possessing these palæozoic rocks, with many ores and metals, and vast and rich coal fields, the empire of China, with its rich products of the soil, lies before us as a wondrous mine of wealth and lucrative commerce, which when opened out to Europeans may operate greater changes in our international relations than all the gold of California and Australia.

From the knowledge we have already obtained of the central and southern parts of China, it would seem pretty certain that we have attached too great an importance to the territory around Canton, which is cut off from the vast central and most populous portion of the empire, watered by the Yang-tsze-kiang, by a chain of mountains at no long distance from the seaboard. Hence the rivers which flow from that ridge to the south, being short and small, are valueless as highways for commerce, when compared with the great central stream which flows from east to west for a distance of 3000 miles.

Though this is no place for political digressions, I must be forgiven if I make public a fact which has come to my knowledge from two reliable and independent sources respecting a Chinese public character, the Mandarin Yeh. Looking to the rigour and apparent wholesale cruelty of his measures when governor of the province of Canton, the English public have been led to regard him as a monster of cruelty. I am, however, assured, by both Mr. W. Lockhart and M. Skatschkof, that Yeh simply carried out the orders of his Government, which shows no mercy to rebels;—the latter, indeed, having spared none of the Imperialists, including a number of Yeh's relations. On the other hand, my informants affirm that Yeh is an example of virtue in China; inasmuch as though he might have become very rich at the expense of the natives, who are usually oppressed by the Mandarins, he is a poor man—further, it is stated that he is a very learned person, who, owing all his advancement to his superior knowledge, has larger and more enlightened views of government than most of the leading men in China.

Chinese emigration appears indeed to increase from year to year, and, in regard to our own possessions in the Indian Islands and Australia, we can already reckon about 150,000 Chinese settlers or subjects. Again, our imports of the two Chinese commodities, viz. tea and silk, amounted, during the last year, in value to twelve millions, whilst the two articles, of tea in England and opium in China, yielded to the English and Indian exchequers a revenue of nine millions sterling.

These simple facts proclaim the vast importance of obtaining a better knowledge of an empire which contains at least one-third part of the whole human race, and whose inhabitants are more ingenious and industrious than any other Asiatic population.

Asiatic Archipelago.—On the subject of the great Asiatic Archipelago, three papers have been read before the Society, to which I shall presently particularly advert. It is just three centuries and a half since this large portion of the globe was first made known to the civilised world, and the larger portion of it is still to be discovered as a field for future exploration. A few words, derived from my friend Mr. J. Crawford, will convey a notion of the geographical importance of this field of discovery. The high-road of nations to the empire of China, the Hindu-Chinese countries and Japan, lies inevitably through this Archipelago. It contains four of the largest islands in the world, Borneo, Sumatra, New Guinea, and Luçon, with an united

area of 630,000 miles, or six times the extent of the British Islands. The longest volcanic band in the world runs through the whole Archipelago, to the length of at least 3000 miles. This band (containing no fewer than 45 active volcanic mountains, the lowest of which is higher than Vesuvius, while the highest exceeds Etna), is a distinct region from the non-volcanic portion, and is, by its fertility, distinguished from the crystalline and sedimentary portion.

This non-volcanic portion of the Archipelago, by far the larger, has, however, its peculiar advantages; for while the useful metals are wanting in the volcanic region, they abound in the other. This non-volcanic region contains the richest and the most extensive tin field in the world; for that ore is found, at intervals, over seventeen degrees of latitude; and while its produce is as yet confined to the washing of the alluvium containing the ores, the yield of metal is already double that of Cornwall. Iron ores of excellent quality are found in Borneo, which island also contains mines of gold, which were considered comparatively rich until the discovery of those of California and Australia. Borneo further contains the richest mines of antimony at present known to us, and although discovered only thirty years ago, they now furnish the main supply of Europe. The same island furnishes coal, a mineral far more important (if it be the old coal?) than any of the above, which is at present worked by English companies.*

The vegetable products of the Archipelago immediately useful to man are probably more various than those of any other quarter of the globe. It produces the larger portion of the spices consumed by mankind, and its volcanic region is eminently adapted to the culture of corn and pulses, of the sugar-cane and coffee. The present yearly produce of the last article, although an exotic, is estimated not to fall short of 25,000 tons.

In the department of zoology, I will only refer to its principal member, man. The inhabitants are of two distinct races, the Negro and the Malay, and each of these is divided into many sub-varieties, speaking as many different languages as the people occupying an equal extent of America. A curious and important fact, connected with the distribution of man over the Archipelago, is especially deserving of notice. By far the most numerous, and also the most civilised portion of the inhabitants, is found in the volcanic and smaller region. The entire number of the inhabitants has been computed

* On the S. side, coal is also worked by the Dutch.

at twenty millions, of whom no fewer than seventeen are in the volcanic region. Java alone, abounding in volcanic rocks, contains ten millions, or one half the population of the entire Archipelago. The two little volcanic islands of Bali and Lombok, of which the united area is but 3,300 square miles, have a computed population of 1,250,000, which is probably equal to that of non-volcanic Borneo, of eighty times their extent!

On the subject of the vast country which has thus been sketched, three papers have, as already stated, been read before the Society. The first of these, in importance, is that of Mr. A. R. Wallace, on the Arru, or Aroe Islands. This singular group lies towards the eastern extremity of the Malayan portion of the Archipelago, and is but 200 miles from the south-western coast of the great island of New Guinea, a comparatively shallow channel lying between. They are low islands, for the most part covered with forest, the larger being seven in number, and divided from each other by such narrow channels, that, but for the saltness of the water, the voyager might fancy himself in an ordinary navigable river.

The inhabitants are a quasi-negro people, but now considerably intermixed with Malays, Javanese, and natives of Celebes; some converted to the Christian, some to the Mahomedan religion, but some also continuing heathens. Of all the Oriental Negroes they are the most docile and industrious; being made so by their trading intercourse with strangers. Their sterile land will yield no human food except maize and yams, and they receive their rice from the more western islands of the Archipelago. An extensive bank, on the eastern side of the group, is productive in the mother-of-pearl oyster, in an inferior kind of pearl oyster, in the tripang, or holothurion, and in the shell tortoise; and the fishing of these is the chief employment of the natives. The Aroes are an emporium to which the western traders resort for the commodities now enumerated; while the islands themselves yield most of the birds of paradise, and the various parrots which, under the Malayan names, somewhat corrupted, of Lories and Cockatoos, are esteemed by distant nations.

The similarity or identity of the plants and animals of the Aroe group, man included, with the comparative narrowness and shallowness of the sea between them and New Guinea, has induced Mr. Wallace to come to the conclusion, that these smaller islands once formed part of the continental island. This is a matter which this enterprising traveller and accomplished naturalist will be better able to reason upon when he visits New Guinea, as he proposes.

Meanwhile, I would bring to your recollection that there has been read before us, by our Associate, Mr. John Yeats, an able paper on New Guinea, being a translation from the Dutch of Dr. Müller. That scientific traveller proceeded, in the quality of naturalist, with a Dutch expedition in the year 1835, and his account of the part of the great island which he saw is by far the best which has ever been given to the public.

The third paper is that of Lieutenant de Crespigny, R.N., who proceeded to Borneo, recommended to our distinguished Medallist Sir James Brooke by our late President, Admiral Beechey. Lieutenant de Crespigny gives, in a letter to our Secretary, an intelligent account of a river and country at the extreme northern end of Borneo, probably never seen, and certainly never before described, by an European.

Australia.—We cannot often expect to grasp so much fresh geographical knowledge respecting this vast country of British occupation as was laid before us last year by Gregory and his associates. Still, in respect to that portion of Northern or Tropical Australia in which that expedition first disembarked, and was for some time encamped, many interesting and new details have been produced by Mr. Wilson, the geologist, who has recently returned to England. Having had charge of the camp whilst Mr. Gregory made his first movement southward and ascertained the existence of a saline interior desert, this gentleman lost no opportunity of surveying accurately certain tracts around him, by scanning the nature of the rocks, the botanical products of the soil, and also by observing the natives and lower animals which inhabit the region watered by the Victoria and its affluents. His companion Dr. Ferdinand Mueller, the botanist of the expedition, who was also stationed in the camp of which Mr. Wilson had the charge, thus writes to me from Melbourne respecting him: "I feel it my duty to bear testimony that his exertions in the general duties of the expedition, whilst commanding at the main camp, were praiseworthy in the highest degree." *

After laying down the topography on maps, accompanied by pencil sketches, which give us a fair conception of the horizontal ridges of sandstone and trap rock with occasional limestone, the author estimates that there are tracts of not less than five millions of acres in extent, which, being covered by the richest grasses and

* I may also record the testimony of Mr. Humphrey, a volunteer attached to the expedition, in favour of Mr. Wilson.

well watered, are specially fitted for pasture, and therefore suitable for the permanent settlement of a civilized community. He also points out that no other part of Australia possesses so many navigable rivers as the northern seabord, the Victoria having been ascended by the schooner *Tom Tough* to 100 miles above its mouth. Though necessarily hot, the climate is by no means injurious to European life, as proved by the fact that, although living there for nine months, the party did not lose a man, and scarcely any sickness prevailed. The thermometric tables kept from November to July indicate a range from 47° as a minimum to 106° as a maximum, with 84 days of rain. The grasses are described as so luxuriant as to grow from 6 to 10 or 12 feet in height; large timber is scarce, though smaller and other trees bearing fruit are not rare. Rice was found indigenous in one spot by Dr. Mueller, and in another by Mr. Wilson, who ascertained that it was eaten by the natives. Fish are plentiful, but kangaroos are scarce. Not now advertising further to the descriptions of various other animals, including the curious walking fish, and noting that the dingo or native dog is larger than in other parts of Australia, I revert with satisfaction to the ascertained healthiness of the country as well as to the fruitfulness of the soil to support the suggestion which I made many years ago, and again brought to your notice at the last Anniversary—that, whether by the establishment of a penal settlement or a free colony, North Australia ought unquestionably to be occupied without further delay.

On my own part I adhere to the opinion that, craving as we do any site to which we may transport felons (why not rebellious Sepoys?), there is no region on the globe which combines more advantages, with the gain of a high political object, than the north coast of Australia with its bays and streams. The convicts who might be first planted there, as I have previously shown, will be so completely cut off from all other parts of the seabord of Australia which are occupied or can be occupied for a long time to come, as to prevent the escape of criminals. Now, as few persons will deny that it is of great importance that our maritime power in the Indian Archipelago should be sustained by having a port on the coast of North Australia as a refuge for our ships, and as a “point d'appui” for naval operations in case of war, so I trust that after colonizing the other sides of this continent, England will no longer abstain from unfurling her flag on its northern shores, whether by forced or free labour.

The reader who is interested in tracing the progress of discovery

in Australia will find a clear and well condensed historical review * of the same by Dr. Ferdinand Mueller, to whom I have already alluded, and to whose valuable labours due reference was made at our last Anniversary. Excluding from this summary all that relates to maritime survey, the author enumerates the explorers of the interior in the last 40 years, and indicates the amount of discovery made successively by Evans, Oxley, Allan Cunningham, Hume and Hovell, Sturt, Mitchell, Henty, Grey and Lushington, Strzelecki, Clark, Wickham and Stokes, Eyre, Leichhardt, and Kennedy. Dr. Mueller renders his article doubly valuable by giving in Mr. Gregory's own words a description of the physical geography of Western Australia, in which country that geographer was so long a resident. He further sketches with the pen of one well acquainted with the country the outline of his late journey from Tropical or Northern Australia, and brings together the various notices of recent journeys in South Australia, by Hack, Babbage, and certain settlers, and concludes that any rivers which would afford the means of penetrating far inland can nowhere be expected to exist (setting aside the mighty Murray and its tributaries), unless they be found between the FitzRoy River of North-West Australia and Shark Bay, a region where we have no settlement, and the coast of which has not yet been surveyed.

Colonel Gawler has also printed a little summary of geographical discoveries during 1857, to the west and north of Eyria in South Australia, to strengthen what he considers to be the evidence that the "country to the west of Lake Torrens is the true and practicable line of communication for rail and common road and electric telegraph between the south-eastern provinces of Australia, the great interior, Stokes's Victoria river, and the north-western coast in general." However incredulous I still am, as to the discovery of any considerable extent of really valuable country in the region to the north of Lake Torrens, or in finding habitable and rich oases in the great central portion of the continent, towards which the country seems to lower and become saline, and notwithstanding that I think Colonel Gawler's views too sanguine, it would ill become the President of this Society to damp the ardour of those researches by which alone the question can be permanently settled.

Mr. Hack has already laid open a band of country fitted for pasture, and furnished with supplies of water, which lies between the great saline tract of the seaboard explored by Eyre, and the

* Read before the *Institute* of Melbourne, 25th Nov., 1857.

equally saline region on the north as made known to us by Sturt. Now, although this belt may possibly serve as a line of traffic between South and West Australia, it yet remains to be proved if, by surmounting the natural obstacles and want of water on the north, experienced by Sturt, it be practicable to reach beyond the saline desert in that direction, or find in the centre of Australia, any oases of good land supplied with natural springs. Mr. Herschel Babbage, who had distinguished himself by a former survey in South Australia, is now determining the question. This gentleman has recently explained to the Philosophical Society of Adelaide the detailed manner in which he hoped to carry out his survey; and I am happy to say that his project is devised with the mathematical precision and accuracy of delineation, whether as regards the instruments he was to use, or the methods by which he hoped to overcome the obstacles opposed to him, which are well worthy of the son of our eminent mechanical philosopher.

When we reflect upon the arduous task to be accomplished, and the incessant labour of extracting fresh water from salt throughout so vast a breadth of saline country as the party must traverse to reach any portion of the expected land of promise, we cannot too much admire the devotion and skilful appliances with which such difficulties are to be overcome. A cheering vista has indeed been suggested in the reports that cattle have migrated from the north, where they must have pastured: but whether this should prove to be well founded or not, whether the colonists may be gratified by the discovery of a rich interior, which we must all heartily wish for, or depressed by ascertaining the positive continuation of a saline desert northwards, geographical science must gain curious additions by this arduous enterprise.

Gold produce of Victoria.—As fourteen years have elapsed since I first addressed you on the rocks of Australia, which were destined to prove auriferous, and as I have in subsequent years, including our last Anniversary, adverted to the produce of gold, it may be expected that I should say a few more words on the subject, particularly in relation to the highly productive colony of Victoria. Mr. Selwyn, a distinguished élève of the Geological Survey of Britain, and Professor M'Coy, the well-known palæontologist, have now completely set the geological features of the case at rest, and have demonstrated that the principal auriferous quartz veins (or those from which all the productive gold shingle or gravel has been derived) occur in slaty rocks of Lower Silurian age, as proved by

their imbedded organic remains. These veinstones (the reefs of the miner), which are rarely more than a foot or two in width, have here and there yielded a good deal of gold near the surface, and hence numerous shafts have been imprudently sunk deep into them. Many of the operators have already found to their cost that these sinkings are profitless, either by the diminution of the ore or by the expense and difficulty of extracting it. In truth, the result, as far as the present trials go, seems to justify my former inferences as based upon the experience gained in other gold bearing countries. The report of the mining companies of Victoria is to the effect that already ten of the shafts which had been sunk into the solid rock had been abandoned, and that enough had been already done to vindicate the old scientific inference, that in a general sense (though there are exceptional cases) deep mining for gold in quartz rock is profitless.

Very different, however, is the produce derivable from the auriferous débris. For, although many of the old diggings have, as I anticipated, also been exhausted, or the materials which filled the natural troughs and depressions worked out, Mr. Selwyn points to considerable tracts of country over which such auriferous débris will yet be found to extend, whilst he regrets that he is unable to define the probable range and limits of such detritus from the want of any accurate geographical maps. In reference to all the yet unexplored tracts through which it is believed the gold detritus may extend, the geological surveyor naturally calls for the same sort of detailed map as that which represents the gold bearing region near Mount Alexander as trigonometrically surveyed by Mr. W. S. Urquhart, and brought out by Mr. Arrowsmith on the scale of 3 inches to 2 miles.

Referring you to what I said last year respecting the time which may possibly elapse before all the gold shall cease to be profitably extracted from the rich heaps which are more bountifully spread out in Victoria Land than in any known part of the world, I repeat my conviction that, whether in a quarter of a century or more, the period will soon be roughly and approximately estimated (*i.e.* so soon as the geologist is furnished with good maps) when the exhaustion of the *great* produce of Victoria shall take place. Whether the existing causes of the decline in produce, including a deficiency of water for the works, be or be not of a temporary nature, it is a matter of fact that the amount of the past year has been below the average of the preceding years.

AFRICA.

Livingstone, or Zambesi Expedition.—As few events have reflected greater credit on the British nation than their warm and affectionate reception of the good and noble minded Livingstone when he emerged after so many struggles from the heart of Southern Africa, so it is most gratifying to every friend and admirer of that excellent man to know that the produce of his pen as a record of those travels has had so great a sale as to ensure a competency for his wife and children. The 30,000 or 40,000 copies of his remarkable volume, which the public eagerly bought, constitute the real monument which the author has raised for himself!

When I lately presided at the great festival held to wish him and his associates God speed, and dilated upon their prospect of success, I endeavoured at the same time to moderate the over sanguine expectations of the mercantile portion of the public in reference to the trade which might speedily be opened out with these regions.*

It is also well to bear in mind that there are difficulties to be surmounted even in the ascent of the Zambesi, of which persons unacquainted with the oscillatory nature of African rivers must be informed. Thus, Mr. McQueen, our sagacious critic on all South African subjects, writes to me, that when the celebrated Portuguese traveller Lacerda † ascended the Zambesi in 1798, and when it was in full flood, he found that for spaces of 9 or 10 miles the stream had a depth of 3 feet 4 inches only; the current being so rapid that he was obliged to unload his small boats and transport his baggage by land. We must, therefore, be prepared to hear of similar obstacles to navigation in Livingstone's case; but let us hope that they are now in the very act of being overcome by the forethought and enterprise of a leader in whom we have every confidence, supported as he is by a naval officer, Commander Bedingfeld, of great experience in the navigation of African rivers, and heartily sustained by associates, each of whom is thoroughly adapted to effect the special object of his mission, ‡ whilst all of them are sincerely attached to their undaunted and sagacious chief.

* See Proceedings, vol. ii., p. 116.

† Lacerda's Journals of the Expedition to Cazembe were published at Lisbon in the 'Annaes Maritimos' for 1844, and are in our Library.

‡ The other officers in addition to Commander Bedingfeld are Mr. C. Livingstone, secretary and superintendent; Dr. J. Kirk, surgeon and naturalist; Mr. R. Thornton, mining geologist; and Mr. T. Baines, artist and storekeeper.

Niger Expedition.—In reference to the Niger, or Quorra, I have been further reminded by Mr. M'Queen that both Clapperton and Lander have left behind records that the river for some distance both below and above Boussa, if not unnavigable, owing to rocks and rapids, is probably useless as a highway for any trading purpose. In the days, however, of those explorers, steam had not been applied in the ascent of African rivers; and although too great a confidence in that power may have led to the dilemma by which the *Day Spring* was wrecked, we have the satisfaction of knowing that, although the party lost their papers and collections, and saved barely provisions and articles of barter enough to support themselves, and possibly to effect the main object of the expedition, still it was supposed that the persevering and able commander, Dr. Baikie, might succeed in establishing an intercourse with the Sultan of Sokato. At the same time the arrival of another steamer, the *Sunbeam*, which has been so speedily equipped by Mr. Macgregor Laird, will soon restore the confidence in our resources with which it is sought to impress the native chiefs.

We must, however, bear in mind that attempts to navigate unsurveyed tropical (African) rivers must be attended with danger, owing to the great oscillations in their depths between the periods of high flood and those of the dry season.

In thus briefly alluding to the Niger Expedition, of which I still hope to announce good results at our next Anniversary, it is gratifying to know that one favourable circumstance has already arisen out of their effort, in the establishment, by our Associate, Mr. May, of a direct and undisturbed line of transit between Boussa and our great establishment of Lagos, on the coast, which promises to be of high importance in securing our intercourse with Central Africa.

Congo, &c.—The Congo was ascended in the beginning of last year by Commanders Hunt and Moeresby, R.N., who, after great exertion in tracking their boats against the powerful current, were finally brought to a standstill by what they consider to have been the cataracts of Yallila, four days above Embona.

The river was broad and uninteresting for the first 70 miles, as far as Embona; but immediately beyond that place the nature of the country it flowed through underwent a complete change, and high hills, diversified scenery, and luxuriant vegetation began to appear. The current increased in rapidity, until at the farthest point reached by the party the Congo poured its whole stream between two promontories only 250 yards apart, roaring and rushing with fearful

violence, and forming immense breakers and dangerous whirlpools, such as no vessel could possibly live through. Commander Moresby considers that a steamer of light draught would have no difficulty in ascending up to this point, which must, I suggest, prove to be of high interest to the geological explorer, who will probably meet near the cataracts of Yallila with the same hard and crystalline axis of the country as occurs in a more northern parallel at Boussa, on the Niger or Quorra.

A short journey has been made by Dr. Bastian in the province of Congo, preparatory, it is believed, to a future and a more extended exploration. Many valuable facts relating to the tribes of the interior are said to have been collected by him.

On consulting with our African Medallist and one of our Hon. Secretaries, Mr. Francis Galton, I find his opinion to be that there is no direction in which an explorer could travel by which he might add more to our knowledge of Africa than by starting from one of the seaboard towns of its south-west coast, such as Loando, and journeying thence in a north-easterly direction as far as circumstances would permit, and as near as possible to the eastern countries now being explored by Captain Burton. Every step in such an expedition would, I admit, be a distinct gain, and serve in a remarkable manner to lay bare the vast remaining tracts of the terra incognita of Africa.

Central Africa.—The preceding observations, and those which I offered to you at the last Anniversary in reference to the great difficulties which Dr. Barth had surmounted, naturally lead me to speak of the two concluding volumes of the work of this great African traveller, which are just issuing to the public. These volumes narrate his proceedings subsequent to the death of Dr. Overweg, on the borders of Lake Chad, and include the most interesting part of his entire journey and his sojourn at Timbuctu. In addition to his 'Travels,' Dr. Barth has delivered lectures before the British Association (at Dublin) on the Hydrography of the Niger, before the Asiatic Society on the Ethnology of the Berber (Tuarick) race, and at the last meeting of this Society he gave us an epitome of the physical and social geography of Northern Africa, in the construction of which he made ample use of the labours of African geographers, in a sound knowledge of whose works there are few who rival him.

It will be obvious, from the nature of Dr. Barth's investigations, that it is perfectly impossible for me to condense his results into a

few paragraphs. The main physical features of the land he travelled in, and the principal geographical discoveries of himself and his coadjutors, are already known to us, and are incorporated into the popular geography of the day ; as, for example, the desert plateaux with their Alpine oases, the upper course of the Chadda-Benue, and the vast lagoons and floods of these central equatorial regions. For the rest, we are furnished with such a multiplicity of independent details, that broad, general views, calculated to convey a correct, though cursory knowledge of his labours in Northern Africa, can with difficulty be embraced on this occasion. He deals with ten or twelve distinct races, each unlike the rest in features, customs, and languages. We have to consider them as distributed into about as many nations, but in such a manner that the boundaries of their territories by no means coincide with the boundaries of the races ; and, in addition to this entanglement, we find large settlements or colonies of Fellatahs and of Tuaricks dispersed about the country, bearing relations of a most diverse and anomalous character, both to the government of the land they inhabit, and to that whence they migrated.

The physical features of North Africa are equally various : a fertile band lies adjacent to the Mediterranean ; then comes a desert, studded with oases ; and, lastly, by a more or less gradual transition southwards, the scene is utterly changed, and an excessive drought and barrenness give place to the very opposite extreme of humidity and equatorial vegetation. Where, then, the kingdoms do not correspond with the races, and neither of them with the physical features of the soil ; where the state of society is in a constant flux of warfare and change, leaving few records of its transitions (and those of the most meagre description, dating back some to the times of the Roman empire, and others to the 10th, 12th, and 14th centuries), it is easy to conceive that a geographer like Barth, whose line of inquiry is eminently historical and social, and who is remarkable for the patient accumulative industry of his countrymen the Germans, should have gathered a mass of matter which his voluminous publications appear insufficient to exhaust, and to which it is totally beyond my power to do justice in this Address. I am, however, convinced that there is no method of epitomising his labours so convenient as that of displaying them upon large maps, variously shaded and tinted, to show the races, nations, population, physical features of the country, and so forth ; such as those that were submitted by him at our last evening meeting. Those maps

and his accompanying memoir will, I trust, be hereafter published in the Society's 'Journal,' and it must be to them, rather than to any description of my own, even when aided as I have been by the study of Mr. Galton, that I beg to refer all those readers who desire to learn the nature and the extent of our gains in African geography due to the indefatigable industry of our medallist, Dr. Barth.

Cape of Good Hope.—A careful survey of the lower course of the Orange River has been made by our Associate, Mr. Moffat, the son of the well-known missionary, and the brother-in-law of Dr. Livingstone, under circumstances of difficulty, owing to the exceedingly desolate nature of the country through which that river runs. His paper is of interest, not only as an accession to the descriptive geography of an almost unknown region, or as delineating the northern boundary of our colony, but also as throwing light on the general physical geography and geology of that part of Southern Africa.

Ovampo.—The country of the Ovampo, first reached by Messrs. Galton and Andersson, has again been visited by a party whose expedition ended disastrously. Two of the missionaries of Damara Land, accompanied by Mr. Green and a party of 30 Damaras, had hoped to cross Ovampo Land and to reach the river Cunene. The king of the Ovampo offered them hospitality, but on their arrival, for some unexplained cause, he peremptorily refused them passage, and when they had made ready to return, the population rose en masse, attacked them, and killed one of their attendants. After half a day's defence, in which many of the Ovampo were killed, the party had the good fortune to escape unharmed into the wilderness, and after three days and two nights of forced marches reached a watering-place, and thence made their way back to Damara Land. The route of the travellers was parallel to that of Mr. Galton, and many geographical features were discovered, including a small lake, but the detailed account of their observations has not yet reached us.

Mr. Andersson, the Swedish explorer, to whom we gave one of our honours in 1854, has announced his intention of himself travelling to the Cunene River, and he probably started on his expedition from Walfisch Bay in the beginning of this year. Although he describes himself as very inadequately equipped, we must hope that his long familiarity with South African travel will compensate for other deficiencies.

Senegambia.—The districts adjoining the Senegal are becoming far better known to Europe than they have been hitherto. The French at St. Louis, dissatisfied with their position of dependence upon the

capricious good will of the native chiefs, have made vigorous efforts to secure to themselves an open navigation of the river, respect to their flag, and cession of land for settlements along its course. Much information has been gained in consequence of their exertions; and interesting communications upon Senegambia appear frequently in the '*Revue Coloniale*,' a monthly periodical, to which I would direct the attention of those who follow with interest the progress of civilisation in Western Africa, or who may desire to inform themselves upon French colonial interests in general.

Mozambique.—In turning to the east coast of Africa, let me say that Mr. M'Leod, our newly-appointed consul at the Portuguese settlement of Mozambique, is proving himself to be of great service both to his country and to the cause of science. In a letter, dated December 14th, he informs me that he had called the attention of our Government to the great advantages of establishing a steam-postal communication between Aden and the Cape of Good Hope, showing how much time would be saved thereby in comparison with the present line. This subject would have been brought under your consideration, had I not reason to believe that the expenses already incurred in establishing and maintaining the present line of communication are considered too great, on the part of the Treasury, to permit a new large outlay.

Again, in the suppression of illicit measures for carrying on the slave-trade, under the name of *Free Emigration*, but which is frequently a mere guise for a real trade in slaves, Mr. Lyons M'Leod, who is exerting himself with energy, gives great praise to the present Portuguese Governor-General of Mozambique, who, despite one-sided judges and the old habits of the colonists, is determined to carry out the sentiments conveyed to the British public, at the Farewell Dinner to Livingstone, by Count Lavradio, the enlightened representative of the King of Portugal, in relation to the extinction of that detestable traffic.

Mr. M'Leod has also communicated to me a rough Portuguese chart, or rather two plans, of the river Zambesi, which, if it had arrived somewhat sooner, might have been really serviceable to Livingstone and his associates. Major Sicard, the Governor of Tete, had promised Mr. M'Leod further information respecting the Zambesi, and also plans of that part of the country where the coal-mines are situated, with a description of the launches now used in conveying the mineral to Tete, the mode of obtaining it, &c. From the same source, our active Consul was also gathering information con-

cerning the medicinal plants of the banks of the Zambesi. He has further written to the Chamber of Commerce of Manchester, informing them that the cotton shrub grows close to his house on the mainland, opposite Mozambique, and that he has already stimulated some of the influential residents to clear a considerable space of ground for its cultivation. As the climate and soil are peculiarly favourable to the culture of the cotton plant, he requests that seeds of the three well-known varieties should be sent to him, in which case he proposes to send the "Nankin" and "Green seed" varieties up the Zambesi, and far into the interior, and to reserve the "sea-island cotton" for culture on the coast; the sandy soil being better adapted for this variety, the growth of which would be favoured by the saline breezes of Mozambique.

In pursuing researches like these, and in thus preparing the way for the great improvement of South-Eastern Africa, which the mission of Livingstone is to carry further out, it is refreshing to find our Consul so zealously and cordially aided by the Governor-General of Mozambique, not only in all objects tending to the suppression of the slave-trade, the improvement of commerce, and the increase of material prosperity, but also in many scientific researches. Among these may be numbered a series of observations on the currents of the Mozambique Channel, for the determination of which the Consul has prepared a thousand copies of a printed circular, with explanations in four languages, which he delivers to captains of vessels sailing to the Mauritius, Port Natal, the Cape, Zanzibar, Johanna, and Bombay, whilst the Port Captain furnishes him with extracts of the logs of the vessels arriving—so collecting materials for wind and current charts, on the plan of Lieut. Maury. When I add that Mr. Lyons M'Leod is keeping a meteorological register on the mainland, whilst the Governor-General keeps one on the island of Mozambique, and that he has steadily made magnetic observations, you will all agree with me that our Associate is a person well qualified, by his energy and capacity, to extend the benefits of commerce, science, and civilisation on the East Coast of Africa.

I am not indeed without hopes that the range of the usefulness of this active Consul may be extended along the East Coast; and that, seeing the importance of establishing regular communication and intercourse between Natal on the south, and the rich Somauli provinces of the Imaum of Muscat on the north, our merchants may drive an extensive and lucrative trade, a considerable part of which,

let us hope, will be furnished from the Zambesi, and out of territories now about to be explored by Livingstone and his comrades.

Expedition from Zanzibar and Mombas into Eastern Africa.—Captain Burton and his colleague, Captain Speke, have now fairly set to work upon their great expedition into Eastern Africa. When they first arrived at Zanzibar many circumstances concurred to recommend a preparatory trip, and the party travelled from Mombas as far as Fuga, following the course of the Pangány river. The setting in of the rains made further progress impossible, and no new information was acquired by Captain Burton upon the white-capped mountains of Kilimandjáro and Kenia. Having partly recovered from the severe acclimatising fever (which no traveller from the Zanzibar coast can avoid, and which had totally prostrated the members of the expedition), the rains having subsided, and porters, asses, guides, with an escort having been procured, Captain Burton sailed with his numerous party from Zanzibar to Baga Moyo, and at once started for the interior. Two communications have reached us relating his further progress; the last of them was dated Sept. 6th, S. lat. $6^{\circ} 40'$, and E. long. $35^{\circ} 40'$, or at a distance of about 200 geographical miles from the sea coast in a direct line. These communications consist chiefly of route maps by Captain Speke, on a large scale, together with numerous observations for latitude and elevation.

On leaving Baga Moyo the party proceeded up the Pangány river to a distance of 120 geographical miles from the sea-coast, passing over an extremely luxuriant country, very level, and abundantly cultivated, but apparently, like other great alluvial or delta accumulations on the immediate sea-board of Africa, pestilential to European constitutions. At about E. long. $36^{\circ} 50'$ a hilly district was reached, which proved to be the face of a vast elevated tract, gradually sloping upwards towards the interior. At the point whence we last heard from Captain Burton the land had attained an altitude exceeding 2000 feet, and a still more elevated country was before him.

It will be of extreme interest when Captain Burton's report of the geology of the country shall reach us; for even the facts stated seem to bear out the opinion I advanced from this chair at the Anniversary Meeting of 1852, and which the subsequent discoveries of Livingstone corroborated in a satisfactory manner, namely, that South Africa certainly, and the whole of the continent

probably, is a vast trough or basin, encircled on all sides by higher ridges.* It will be recollected how I then showed, that these ridges, wherever we had certain knowledge of them, consisted of primeval or palæozoic rock, for the most part crystalline—that they enclosed fresh-water deposits of younger age, and lacustrine character; and, therefore, that the main physical features of modern Africa, such as I have described them to be, are those which have continued to characterise that continent from the earlier geological epochs down to the present day.

My hearers will also recollect that, justified by the discoveries of Livingstone, I took occasion, at our last Anniversary, to throw great doubts on the existence of snow-capped mountains in these equatorial latitudes. As far as they have gone, the observations of Burton's party throw no new light on that hypothesis; and it still remains to be determined whether or no the Nile, like the Zambesi, Congo, and Niger, has its chief sources in the great watery interior plateau. (*See Ann. Address, 1857, p. clxx.*)†

* *See also Dr. Livingstone's Cambridge Lectures, with a Prefatory Letter by Professor Sedgwick. Edited by the Rev. Wm. Monk, &c.; with map by Arrowsmith, granted especially by the President and Council of the Royal Geographical Society.*

† Whilst these pages are passing through the press, accounts have been received informing us that Captains Burton and Speke had penetrated westwards to near 500 miles from the coast, according to their dead reckoning. They had passed from the Ugogo country, through the Mkali Mgumbu wilderness, had crossed the frontier of the Wanimesi, and they wrote from a place, Unianembe, 70 miles beyond it. The boundaries of the different tribes, and the physical features of the country, so far as our travellers have gone, correspond very closely to the description given of them by the Rev. Mr. Erhardt, who drew his information entirely from native testimony. It will be recollected, that a short account of his memoir, and an accompanying sketch map, were published in the first number of our Proceedings, and, if reference be made to the latter, the point on the line of route whence we have received our latest intelligence will be found to be that which is intersected by the 34th parallel of longitude. Capt. Speke places the real position of the station in question in lat. $5^{\circ} 2'$, and considerably to the westward of that point. The doubts which I ventured to throw out in the Address of last year, respecting the existence of lofty snow-covered African mountains under the Equator whence the Nile flows, and the theoretical view (founded on the observations of Livingstone) which was then propounded, of the origin of great periodical floods by the bursting and overflow of large marshy tracts of Central Africa, might, at first sight, seem to receive some confirmation from the researches and writings of the ancients. My accomplished friend Sir Henry Holland has directed my attention to certain pages of Seneca (*Nat. Quæst., lib. vi.*), in which that author describes his having conversed with two centurions, who, in the early part of the reign of Nero, had been sent to seek out the sources of the Nile. With the assistance of the King of Ethiopia and other chiefs, they had to so great an extent accomplished their task, that further progress by water was impracticable, for they reached great jungles or marshes (*immensas paludes*) in which the smallest canoe, containing one man only, could paddle. As, however, Seneca speaks also of waters gushing from subterraneous reservoirs as probable sources of the Nile, other geographical friends, who were aware of these writings, do not believe that they are to be viewed as trustworthy accounts of the origin of the great river.

A map of the region to the north of Abyssinia, between $35^{\circ} 37'$ long. E. of Paris, and $15^{\circ} 17'$ N. lat., drawn upon the ground in 1857 by Mr. Werner Münzinger, has been published at Winterthur in Switzerland. Besides the small German work of Heuglin, to which allusion was made p. 284, when the merits of the old descriptions of Bruce were brought

PHYSICAL GEOGRAPHY.

Changes of the Surface of the Globe.—Having gone through a variety of details respecting the progress of our science in the four quarters of the globe, I may now draw towards the end of this Address by a few notes on the general and important subject of *Physical Geography*.

M. de Francq has recently occupied himself with some laborious researches respecting the laws which may be recognized in the distribution of land and sea, and of surfaces of relative elevation and depression on the general outline of the globe. Assuming the whole mass of the earth to have been primitively in a state of fusion, and an outer crust to have been formed by cooling and consequent solidification, he concludes that when this process had arrived at a certain stage, the *shrinkage* of the interior nucleus from continual loss of heat would be greater than that of the outer crust from the same cause, and that consequently the solid superincumbent crust would partly lose its support beneath, and be left in the position of an arch or dome too weak to support itself. The result, it is supposed, would be that the shell would collapse by its own weight, and that its surface would be elevated into ridges and depressed into furrows in various directions, producing the inequalities which we now witness. In this idea there is nothing new; but M. de Francq has another assumed principle which forms the base of his very laborious researches. He assumes *that the effect of this partial crushing of the earth's solid crust will manifest itself equally along every great circle of the globe*—a result which he pointed out to myself on a small hollow globe of thin flexible substance when affected by the tightening of strings which draw it into depressions which are accompanied by parallel depressions. It might perhaps be supposed that this effect on any proposed great arc would be

brought out, the literature of researches in Abyssinia has received in the past year a copious and instructive addition by the publication at Rome, through the Propaganda Congregation, of the work entitled '*Viaggio e Missione Cattolica fra i Mensa, i Bogos e gli Habab*,' by the missionary Giuseppe Sapeto. First visiting Abyssinia in company with the brothers d'Abbadie in 1838, and quitting it from bad health after a sojourn of five years, Sapeto made his last journey from Massowah in 1851. His personal adventures, which are told with great animation, form a part only of the contents of this well-filled volume, in which the author has amassed much valuable information respecting the physical geography, ancient divisions, and general history of this country, so gifted by nature, and now in so fallen a state, accompanied by striking sketches of its animal and vegetable productions. He has further added annotations from national documents in the Ethiopian language, with translations into Italian. I am indebted to my friend Dean Milman for an acquaintance with this work, which I had not seen when the Address was delivered, and which is well worthy of perusal by geographers and scholars.—June 30, 1858.

properly measured by the *vertical* extent of elevation or depression combined with the *horizontal* extent along the great circle. M. de Francq, however, has taken only the linear horizontal extent as the measure in question. It is for the natural philosopher and the geologist, rather than for the geographer, to pronounce on the soundness of the physical views on which these researches are founded ; but the facts respecting the distribution of land and sea, of mountains, plains, and rivers, with which these investigations may make us acquainted, as well as the laws according to which they may be grouped and classified, are equally interesting to the geographer, whatever may be the physical principles on which such researches are professedly founded.

It would be impossible for me to enter into any detailed analysis of the examinations which M. de Francq has made of the phenomena along an immense number of great circles. I can offer but the briefest outline of them. In order to render the investigation as impartial as possible, he has fixed upon eight equidistant points on the Equator, beginning with the meridian of Paris. He takes through each of these points 36 great circles equidistant by 5° from each other, thus forming *four* systems (*roses*) of divergent great circles, each system passing through two opposite points of the eight above mentioned. He then examines the horizontal extent, along each great circle, of the lines of elevation (*arcs d'enhaussement*) ; along the remaining portion of the circle there will generally, of course, be depression. All dry land is considered as belonging to *elevation*, but the whole bed of the ocean is not regarded as belonging to *depression* ; for lines along shallow coasts, ranges of islands, &c., which are only slightly and partially immersed beneath the surface of the sea, are also regarded as *lines of elevation*, being supposed in fact to lie above a certain mean surface, to which elevation and depression are referred. Moreover, these great circles frequently pass across regions which are nearly or altogether unknown, in which case he calculates the lengths of the lines of elevation in such regions on the supposition of their being proportional to the lengths of similar lines along the known portion of the great circle, and adopts these calculated lengths as the most probable lengths of the unknown lines in question. Proceeding on these suppositions, he finds (1) that on all those great circles along which the lines of elevation defined by the existence of dry land form together an arc of less than about 100° , there exist submarine lines of elevation, which, together with the terrestrial ones and those which are as-

sumed to exist in the unknown regions traversed by any great circle, make up very nearly the amount just mentioned of 100° ; and moreover, that all such great circles are each characterized by very nearly the same number of transverse lines (*alignements terrestres*) which run perpendicularly to the great circle, and are marked by salient points of the earth's surface, or are recognised as lines of volcanic action, or lines along which, at least, earthquakes are not of unfrequent occurrence. M. de Francq also finds (2) that those great circles along which the terrestrial lines of elevation constitute together an arc of more than about 100° are not accompanied by the transverse *alignements terrestres*, but by others which are parallel to their own directions respectively. These appear to be two of the principal generalizations at which M. de Francq has arrived respecting the existing geographical distribution of land and sea; and one of the most interesting deductions from them may, perhaps, be stated to be that which he draws respecting the probable existence of considerable tracts of land in the polar regions. He finds that those great circles of the first class above mentioned which traverse the polar regions are most defective in the extent of their *known* lines of elevation, but the whole arc above mentioned of 100° is made up in such cases by the calculated probable extent of such lines in the *unknown* polar regions. The harmony thus established between the great circles which traverse the polar regions, and those which lie without them, is regarded by M. de Francq as a proof of the truth of the hypothesis that a considerable extent of land exists in the neighbourhood of one or both the poles of our globe.

One of the great objects of my intelligent and indefatigable friend the Baron de Francq in publishing the ingenious memoirs* which he has successively laid before the French Academy of Sciences, the application of his theory to some of the great geological features of the globe, as specially indicated in the last of these communications, cannot now be adequately discussed. The consideration of this vast subject, on which the eminent geologist Elie de Beaumont has written so ingeniously in propounding views which M. de Francq supports, would occupy in fact a large part of a purely geological discourse. The physical data, however, which the author has arranged and discussed with great perspicuity and infinite pains, in-

* De la Formation et de la Répartition des Reliefs Terrestres, Mém. de l'Académie des Sciences, 28 Fév., 24 Mars, 2 Juin, 1856, et 15 Mars, 1858. See also Bull. de la Soc. Géol. de France, 2 sér., t. x., 1853.

volve questions of high importance to every one who speculates upon the causes which have operated in producing the chains of mountains, and corresponding depressions of the earth's surface.

Movement of Waves.—An original view of the undulatory movements of the sea and its currents has been published at Rome * by Commander Cialdi, of the Pontifical marine service, author of various other works of merit on analogous subjects.† It is out of my sphere to judge the merits of the work of this ingenious author, who, whilst I write, has visited London, to conduct to the Tiber two small steamboats; but I may briefly say, that after an elaborate detail of facts, drawn from the writings of a multitude of mariners, engineers, geologists, and others, to the number of nearly two hundred, and also citing his own long experience when in the Sardinian navy, he endeavours to counteract by such data the prevalent theory of eminent mathematicians, which does not admit of any real motion of transport in the molecules which constitute a wave, nor the power of waves at great depths. To give my hearers some idea of the main object of a work which has been highly commended by the Accademia dei Nuovi Leicei of Rome, as well as by the Academy of Venice, I here cite the author's own words, as conveying his main views:—

“I am convinced,” says Cialdi, “that the real motion of translation (or driving movement) in an undulating mass of water always exists during violent winds and storms, whatever be the depth of the sea; and that it also obtains in moderate weather, but only where the inferior, the lateral, or the frontal development of the wave finds an obstacle, at any distance whatever from the shore. I also maintain that the motion communicates itself to the whole mass that constitutes the wave, when the latter cannot develop itself; and that the intensity of the motion is greatest at the bottom of the sea, and least on the surface, when the depth of water is relatively small, and when the wave is not broken. I further maintain that the effects of this motion are more or less perceptible according to the nature and form of the obstacle, the volume of the undulating mass, and the velocity of its propagation. Moreover, these effects must prove very complicated, and produce all the varied series of powerful phenomena that we observe on abrupt coasts, piers, breakwaters, and shelving shores.”

* ‘Cenni sul Moto Ondoso del Mare e sulle Correnti di esso, 1856.’

† ‘Studi Idrodinamici Nautici e Commerciali, Roma, 1845;’ ‘Sul Tevere e la Unione dei due Mari, Roma, 1847;’ ‘Studi sur Porto di Livorno, Firenze, 1853.’

Current Charts.—Mr. A. G. Findlay has constructed an excellent chart of the North Atlantic Ocean, on four sheets, which embodies in a condensed form the results given in the extensive series of charts published by the American Bureau of Hydrography, as well as other authorities. This chart, intended for the use of sailors, will show the connexion between the different branches of the meteorology of the sea, the similarity between the circulation of the air and water over its area, and their effects on the temperature in different seasons. Among the results it appears that the great mass of waters takes about one year to travel from the Bay of Biscay to the Gulf of Mexico, while the more rapid circulation of the smaller volume from the Mexican Gulf, by the Gulf-stream, occupies about eight months in reaching the shores of Europe. These periods, derived from a careful calculation of all attainable observations, accord very closely with that of the drift of bottles, a collection of which, made by Capt. Becher, R.N., shows that the currents are not so rapid as has been usually considered.

The Gulf-stream ceases to be a marked current after passing eastward of the Newfoundland Banks; its warm waters are then drifted to the east and north-east by the prevailing south-west and west winds, by which cause its effects are propagated to Britain and the coast of Norway.

In 1838 Mr. W. C. Redfield propounded the theory, that the Arctic currents, after passing over the Banks of Newfoundland, flowed beneath the Gulf-stream to the southward and south-westward—a theory which has been confirmed by American navigators, who have found that at a depth of 370 fathoms, or bed of the Gulf-stream, in its narrowest and warmest part, the temperature is at zero. This remarkable and exceptional phenomenon does not, however, extend eastward of 46° W. meridian; for Commander Dayman found in that longitude that the water had a temperature of $39^{\circ}7$,* at a depth of 1000 fathoms, in two instances, showing a remarkable contrast in so small a distance.

The Arctic current had been considered to be lost at Cape Hatteras, in its south-west course; but the cold bands which have been observed by the American surveyors to exist in the Gulf-stream must be derived from this source. There is another curious subject for consideration—the peculiar configuration of the coast of the

* $39^{\circ}5'$ is the temperature assumed by Sir Jas. Ross as that at which sea-water has its maximum density.—*Voyage to the South Pole*, ii. 156, 375, 384.

United States between Cape Hatteras and Cape Fear. These, as Mr. Findlay has suggested to me, may be the result of the conflicting hot and cold currents there neutralising each other, and producing those long sand ridges projecting transversely to the direction of the two streams from Cape Hatteras, Cape Fear, and Cape Lookout, which promontories are separated by long sweeps of low diluvial shores. This reasoning is indeed sustained by another fact, evident on a close examination of Maury's thermal charts, viz., that the Arctic current, or other very cold water, flows to the south-east from off these capes to the southward of the Bermuda Isles.

Deep-Sea Soundings—Geological Analogies—Atlantic Telegraph.—At our last Anniversary your attention was riveted to the great project of establishing a communication between Britain and America, and the preparations for carrying out that noble project. Among these I announced that the paddle-wheel steam-frigate the *Cyclops* had preceded the *Agamemnon*, and that steps had been taken by the Admiralty to secure for naturalists all the materials, whether animal or vegetable, which might be brought up from the sea bottom. This object has been efficiently carried out across the North Atlantic, between Valentia in Ireland and the coast of Newfoundland, the methods employed, and the results, having been clearly reported by the commander of the vessel, Lieut. Dayman. The apparatus employed was a modification of that invented by Mr. Brooke, of the United States Navy, and the results have unquestionably given us a much more extended knowledge of the bed of the Atlantic, and of the temperatures and densities of its waters, than were ever before obtained, thanks to the excellent conduct of the officers and men employed.

Referring to the printed Report for many instructive data respecting the meteorology of the ocean, I will now briefly allude to the support which has been given to geological science by the operations of the officers of the *Cyclops*. The submarine section, which is given at the bottom of Plate 1 of the Report, teaches us, as before said, that, in the 15° of W. long., or about 180 miles from the shore of Ireland, the plumb-line suddenly descends from 550 to 1750 fathoms. This wall of 1200 fathoms in height suggests the idea of one of those former movements by which the crust of the earth has been broken through by a long and deep fissure or sudden disruption.

Another feature of great geological interest is, that having once quitted the comparatively shallow water on the coast of Ireland,

all the soundings, twenty-six in number, which were made in crossing the deep ocean, or between the 15° and 45° of W. long., with two exceptions, when stones and shingle were met with, have proved that the bottom, whether at the maximum depth of 2424 fathoms, or of 954 fathoms on nearing the shores of Newfoundland, is composed of a soft mealy substance, to which Captain Dayman gives the name of ooze.

Now it was a point of great interest to the geologist (one in which I took some personal interest before the expedition sailed, by communicating with Captain Washington, the Hydrographer) to collect any organic bodies brought up from these extreme depths. At my request, indeed, Professor Huxley drew up instructions for the proper preservation of any such objects, which were carefully carried out by Commander Dayman and Dr. Gimlett, the medical officer of the expedition. The specimens of ooze, which have been examined by Professor Huxley, of the Government School of Mines, have led him to believe that nine-tenths of this fine muddy deposit consist of the minute animal organisms called Foraminifera, composed of carbonate of lime, and that 85 per cent. of these are referable to the genus *Globigerina*, in all its various and multiform stages of growth.

Great as is the interest attached to the question, of whence this infinite quantity of these small creatures, mixed with some other Foraminifera, is derived, Professor Huxley does not pretend as yet to be capable of answering it entirely; but, knowing that highly organised animals can live at depths of 300 or 400 fathoms, he is disposed to think that these vastly humbler creatures may have existed at the great depths from whence they are dredged up. Now this ooze, or fine marine mud, not a little resembles our chalk, which also contains the same genus *Globigerina*; and just as the chalk has similar persistent characters, from the cliffs of Albion to Orenburg in Russia,* so this submarine ooze maintains the same aspect and composition over a nearly equal breadth between Britain and America.

Let us hope that, when our Admiralty again decides upon obtaining a systematic series of deep sea soundings, a professed naturalist will be one of the party, in order that, among many curious problems relating to submarine life, he may determine whether foraminifera can exist at such great profundities, or whether, living

* See 'Russia in Europe,' vol. i., p. 272.

at a higher zone, they have on dying simply subsided, to form the chief part of the fine, undisturbed, muddy bottom.

In the mean time the survey of the *Cyclops* has shown, that a perfectly tranquil and secure resting-place is ready for the reception of the greatest length of the cable of the magnetic-Atlantic telegraph. May then the accidental misfortune of last summer be avoided, and may the able and vigorous measures of the Company employed in carrying out this grand international work be eventually crowned with all the success they deserve.

Conclusion.—I have now, Gentlemen, to apologize for having detained you so long in my endeavour to lay before you, not merely an analysis of our own labours, but also of those which have been in progress in most parts of the world, together with brief indications of the theoretical as well as practical appliances by which geographical science has been advanced. Let me conclude then with a few words on some of our own immediate operations as sustaining the reputation of the Society, and as influencing public opinion.

The volume of our Journal, the 27th in number, which has recently been issued, has, I trust, been found equal in merit to any one of former years. The mere announcement of some of the names of the contributors and subjects sufficiently testifies that we are well working out our varied objects of research. Thus, whilst the soldier and scholar are gratified with the scrutiny of certain campaigns of the ancient Greeks placed before us by General Jochmus, as derived from a critical examination by him of battle-fields and marches, other comparative geographers may trace with Loftus the course of the Eulæus.

In delineating those parts of Persia with which he has long been familiar, General Monteith has shown us the lines by which bodies of men can advance, and those where great difficulties must be encountered; whilst Rawlinson, comparing ancient with modern geography, has clearly demonstrated the extent to which the delta of the Euphrates has advanced upon the Persian Gulf in the historic period. Again, in the same region Abbott describes the route from Shiraz to Fessa and Darab; and in turning to the hitherto slightly known country of Burma, we have been furnished with a comprehensive, clear sketch of its geographical features by Captain Yule.

From Africa (not to speak of other contributions) we have those original letters of Livingstone which foreshadowed the admirable work which that explorer was destined to produce; whilst from

British America we have put forth Colonel Grant's practical and useful account of the large island of Vancouver, now rising into vast importance through its fine bays and ports, both as a noble station for maritime enterprise in the Pacific, and a future scene of commerce with our newly discovered golden region in the Rocky Mountains.

In short, all our publications, so ably edited by Dr. Norton Shaw, whether they appear in the more matured and staid form of the Journal, illustrated by those excellent maps of Arrow-smith, which give an impress of accuracy to every work of which they form a part, or those popular Proceedings which keep up the "esprit de corps" of our members, and are constant mementos of the animation of our Evening Meetings, have, I am happy to say, given general satisfaction to all readers.

Rejoicing at our last Anniversary at the great rise of this Society in public estimation, it is truly a source of pride and satisfaction to me to see that in the short interval which has elapsed, 166 new members have joined our ranks, and that we now reckon nearly 1100 ordinary associates, or nearly double our numbers in earlier years.

The grant of the use of their apartment for our meetings, by the University of London and the Royal Society, has been of signal advantage; and many of you can testify that the attendances have been so good as almost to crowd that spacious hall.

Let us hope then that this liberal encouragement will be continued; for no one who has participated in our Evening Meetings can doubt that they are productive of enlightening effects upon society in general, by the diffusion of a much greater love of geographical science and foreign travel than was ever before exhibited in this metropolis. I do not hesitate therefore to assert, that the Royal Geographical Society has now taken such firm root in our country, both as regards commercial and public affairs, as to have become part and parcel of the common-weal. Thus, many of Her Majesty's Secretaries of State, whether past or present, belong to us, and afford us the best support by the transmission of documents which we publish at our own expense, and which, though of great importance to geographers as well as to merchants and travellers, would without our aid have remained unknown. Then again, our Map Office and Library in Whitehall Place are the rendezvous for any persons, official or private, who desire to consult the best geographical documents; this great public advantage being gained

simply by the grant of 500*l.* per annum—a sum I venture to say not amounting to a tenth part of what would be incurred, if our highly useful and really national establishment were managed by any Government.

High as we have risen in the last few years, I feel indeed confident from what I see around me, and from a pretty intimate acquaintance with the mainsprings of our prosperity, that our future career may be rendered permanently useful and brilliant, provided only there be a continuance of the same hearty union and good fellowship which now so happily prevail among us. For the part I have borne in this cheering progress, whether in aiding the onward march or in sustaining the dignity of the Royal Geographical Society, I can with gratitude say that my poor efforts have been much overpaid by your kind approbation. Let me then assure you, that as by a sort of friendly fiction, you have evaded the regulations which prescribe that your Presidents should successively retire from office after two years' service, and are pleased to view my first year's labours during the present consulate, as having been given for my lamented predecessor Admiral Beechey, I will try to perform my duties as before, and will not shrink from the endeavour to render my seventh year of probation as effective as any one of my preceding terms of office.

P.S.—An important geographical feature in the outline of the western portion of the Himálaya Mountains has come to my knowledge since this Address was printed. By permission of our Associate and Gold-medallist, Col. Andrew Scott Waugh, Lieut. T. G. Montgomerie has published, in the fourth number for 1857 of the *Journal of the Asiatic Society of Bengal*, a Memorandum on the Snowy Mountains of the Kashmir series of the Himalayas, in which the Nanga Parbat or Dagarmur, to the north of Kashmir, is estimated at a height of 26,629 feet above the sea.

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1858.

Fourteenth Meeting, Monday, June 14th, 1858.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

ELECTIONS.—*His Excellency Count Platen, Minister of Sweden and Norway; Charles Cavendish Clifford, Esq., M.P.; the Revds. William Atherstone Hales, M.A., Samuel William King, A.M., and Henry Lewis, M.A., and Edward David Ogilvie, T. J. De Bourgho, Pascoe Charles Glyn, William Nicholas Reed, Samuel Leigh Sothely, and William Reynolds Vines, Esqrs., were elected Fellows.*

EXHIBITIONS.—A Map of the United States and the adjacent countries, from Hudson Bay to the Rio Grande, including the whole of British America lying south of Hudson Bay and Newfoundland, measuring 15 feet 4 inches by 26½ feet, was exhibited by Mr. H. V. Poor, of the United States; and a large painting of the family of the geographer, Gerard Mercator, found in the Earl of Peterborough's house at Southampton, was exhibited by Mr. Evans.

DONATIONS.—Among other numerous donations to the Library and Map-Rooms since the previous meeting were, Record Map of Sebastopol, by Captain F. Brine, R.E., F.R.G.S.; maps of the Canton of Zürich, by Professor Ziegler, F.R.G.S.; Report of the Geological Survey of Canada, with accompanying Atlas, by Sir William Logan, F.R.G.S.; the North-West Passage and the plans of search for Sir John Franklin, by John Brown, F.R.G.S.; the Indus and its Provinces, by W. P. Andrew, F.R.G.S.; Dr. Livingstone's Cambridge Lectures, by the Rev. William Monk, M.A., &c., &c.

ANNOUNCEMENTS.—The PRESIDENT announced that Dr. Baikie of the Niger Expedition had written to say that Lieut. Glover had obtained, during his journey to Busa, an old volume, apparently belonging to Mungo Park.

The Papers read were—

1. *Notes on a Map of the United States and the adjacent Countries.*
By HENRY V. POOR, Esq., of New York.

THE best route of commerce across the continent seems to be indicated by the direction in which its great rivers run. The St. Lawrence, running very nearly east, carries a navigable water line into the heart of the continent, a distance of 2500 miles from the Atlantic Ocean. The Upper Missouri, very nearly upon the same parallel with Lake Superior, runs almost due east for 600 or 700 miles, after issuing from the Rocky Mountains. The waters of this river interlock with those of the Columbia, the great river of the Pacific slope of the continent. The directions of these great rivers indicate a deep depression in the continent, extending from ocean to ocean, and a favourable route for a great highway to connect them.

But upon going north, we find a much lower depression than that occupied by the valley of the Missouri River. Lake Winnipeg is only slightly elevated above Lake Superior; the surface of the latter being about 590 feet above the sea, while that of the former is about 850 feet. The rivers that flow into this lake from the south and west have very gentle and uniform currents. The Red River of the North has an inclination of only two or three inches to the mile, and is navigable nearly to its source, by large class steamboats, at all periods of the year when not obstructed by ice. The Saskatchewan, which flows from the west, is one of the great rivers of the continent. Near its entrance into the lake it is for a short distance obstructed by rapids. From the head of these to the Rocky Mountains there is no obstruction to the navigation of the river. The valley through which it runs is depressed from 1000 to 1200 feet lower than that occupied by the Missouri River upon similar meridians. At the mouth of the Yellow Stone River, $102\frac{1}{2}^{\circ}$ west from Greenwich, the surface of the Missouri River is about 2180 feet above the level of the sea. Fort Cumberland, on the Saskatchewan, and very nearly on the same meridian, is only about 900 feet above the sea. Both rivers have, probably, very nearly the same rate of fall. The eastern slope of the Rocky Mountains at the source of the Saskatchewan is, consequently, much more depressed than at the source of the Missouri. This fact would indicate, that after leaving Lake Superior, the best route for a railroad across the continent deflects, northerly, into the basin of Lake Winnipeg and its tributaries, assuming that the mountains can be passed at the head of the Saskatchewan as well as at the head of the Missouri River.

This northern inclination of the route I consider of no solid objection on the score of climate. Only a small amount of snow falls during the winter season—not enough probably to create any inconvenience to the running of railway trains. On going west, the climate becomes much milder. The same law in regard to climate prevails in the western as the eastern hemisphere. It has been well ascertained that the climate of the eastern coast of Asia corresponds almost exactly with that of America, while the climate of the western coast of America is equally mild with that of the western coast of Europe. The isothermal line, after leaving Lake Superior, runs in a north-westerly direction, entirely through the British Possessions, and shows that a large portion of the territory drained into Lake Winnipeg possesses as favourable a climate as some of the best portions of Canada or the United States. In fact the Hudson Bay Company have in possession an area of country equal to six or eight first class American States, admirably adapted to agriculture, with a genial and attractive climate. There is no portion of the United States that will, in a very short time, possess better facilities for commerce. As already stated, the Red River of the north, running into Lake Winnipeg, and interlocking with the head waters of the Mississippi, is navigable nearly to its source, for large class steamboats. To this river a railroad is already in process of construction from St. Paul, an important town at the head of navigation on the Mississippi River. A railroad will, before long, be constructed from the head of Lake Superior to the same point. The distance for which this river is navigable is something over 500 miles. Lake Winnipeg extends in a northerly and southerly direction, nearly, if not quite, 400 miles. Its length is equal to that of Lake Michigan, one of the largest of the great American lakes. With the exception of some rapids near its mouth, the Saskatchewan is navigable to the Rocky Mountains. In a few years more the improvements described will render this territory as accessible to emigrants as any portion of North America. It is therefore of the greatest importance that it should be thrown open to settlement, as an act of humanity to the emigrant, who will soon be unable to procure cheap homes either in the United States or Canada, and as a means of increasing the number of inhabitants in the colonial possessions of Great Britain, and thereby its commerce and trade.

In causing the map (now exhibited) to be drawn, my object was to present at a glance, the geographical and topographical features of the United States, together with its political subdivisions, and its public works. In the topographical features of the United States and Canada there are several great divisions that differ exceedingly

from each other. The western portion of the continent delineated, is occupied by several mountain ranges rising from an immense plateau, extending nearly one third of the way across the continent from east to west. On some parts of this plateau, the width of these mountain ranges is nearly 1000 miles. The great plateau on which they stand begins to rise from the Mississippi and Missouri Rivers. At first the ascent is gradual, but after going west about 500 miles from the valley of the Mississippi River, the rate of ascent of that portion of it drained by the Red Arkansas, Platte, Kansas, and Niobrara, increases to about 8 feet to the mile, till an elevation is reached of from 7000 to 8000 feet above the sea. The western slope of this plateau, and of the mountains which crown it, is, on the other hand, very abrupt—the mountains rising in some cases to an altitude of 13,000 feet in a distance of 100 or 150 miles from the Pacific coast. Between the summits of the Rocky Mountains on the eastern slope of the plateau, and the Sierra Nevada lying on the western, is an immense elevated, arid, and desert plain, having an independent system of lakes (salt), and rivers, similar to the systems of the Dead and Caspian Seas.

The easterly slopes of the plateau of the Rocky Mountains partake largely of the character of the plateau itself, being arid and sterile, till the meridian of 99 or 100 west from Greenwich is reached. In the United States, with the exception of the head waters of the Missouri, only a small, if any portion of the territory between the meridians named, and the summits of the Sierra Nevada, can be cultivated without irrigation; a fact which is only imperfectly understood even by the people of the United States. After the Sierra Nevada is crossed, there is a narrow belt of fertile and well watered country occupied by the states of California and Oregon and the territory of Washington.

The next grand division shown on the map is that occupied by the Mississippi River. This presents features entirely dissimilar to the division just described. It is characterised by the uniformity of the surfaces and inclinations of its great plains, their slight elevation above the sea-level, and the fertility of their soil. The surface of the Mississippi River at the mouth of the Ohio, 1200 miles from the Gulf of Mexico, is only 275 feet above the level of the sea. Above the mouth of the Ohio, the rate of fall is more rapid, yet still very uniform. At the mouth of the Minnesota River, 2192 miles from the Gulf, the elevation of the Mississippi is only 744 feet above tide. The rate of fall from this point to the sea is about 4 inches to the mile. The Mississippi River, though much inferior to the Missouri in length, and in the area of the

country it drains, occupies a much lower level. The dividing line between the Minnesota, a branch of the Mississippi, and the Red River of the north, running into Lake Winnipeg, is less than 1000 feet above the sea. The Missouri River, draining the eastern slopes of the great Rocky Mountain ranges, occupies a much higher plane. At the mouth of the Yellow Stone, about 3260 miles from the sea, its elevation is about 2180 feet. At the foot of the Grand Falls of the Missouri, 3960 miles from the sea, the elevation of the surface of the river is about 2600 feet above tide. The Missouri at its mouth is about 380 feet above tide. The distance from this point to the Grand Falls is about 2570 miles. The river falls, consequently, in this distance about 2220 feet, or at the rate of a little more than 10 inches to the mile. The rate of descent is remarkably uniform; —the lower portion of the river being, probably, the most rapid. Steamboats can run from the Gulf of Mexico to the Grand Falls, a distance of 3960 miles.

It is to the gentle descent of its great rivers, and the ease with which communications can be effected between them, that the United States owe their remarkable facilities for an internal commerce. Lake Superior, the source of the St. Lawrence River, is elevated about 590 feet above the sea. This elevation is distributed over a distance of 2500 miles, the greater portion of the descent being grouped at two points, the falls of Niagara, at the outlet of Lake Erie, and the falls of the St. Lawrence, at the outlet of Lake Ontario. By means of canals this magnificent watercourse is rendered navigable for its entire length. A vessel of large class may now clear from the head of Lake Superior, in the very heart of the continent, for Liverpool or London. A steamer may leave the same point, passing through the Straits of Belle-Isle, the Atlantic Ocean, to the Gulf of Mexico, and up the Mississippi to within *one hundred* miles from the point from which it started, after having made a voyage of nearly 8000 miles. These facilities for commerce give value to the produce and the lands in the interior of the continent, without which they would be valueless. Produce can now be taken from Chicago to New York by water, a distance of 1500 miles, for seven or eight dollars per ton. Owing to the smaller quantity of freight going West, the charge for heavy articles in this direction is only about five dollars per ton. The charges for transportation on the Mississippi River from St. Paul, and from Pittsburgh, at the head of navigation on the Ohio, both more than 2000 miles from the Gulf of Mexico, are at very nearly the same rates.

In speaking of the great interior basin of North America, a portion

of it occupied by the Great Lakes is necessarily embraced. The dividing line between the waters running into the lake, and those running into the Mississippi, is for a long distance imperceptible—the country drained by each presenting similar aspects and structure. The highest point on the line of the Illinois Canal, between Lake Michigan and the Illinois River, a tributary of the Mississippi, is only *eight* feet above the level of the lake: in other words, a cut of ten feet in depth, for not a great distance, would turn a portion of the waters of Lake Michigan into the Mississippi—so nicely poised in the centre of the continent are these great Inland Seas. It seems not unlikely that the ocean once flowed through the valleys of the Mississippi and St. Lawrence, forming an island of that portion of the United States occupied by the Alleghany, and its connecting ranges of mountains.

The third grand division of the continent shown on the map is that drained by the St. Lawrence and its tributaries. Although upon the south shores of Lakes Michigan and Erie there is nothing to mark the dividing line between the great division already described and the one now under discussion, as we go north and east the boundaries between the two become well defined. The summits between Lake Superior and the Mississippi are elevated all the way from 500 to 800 feet above the lake, except in one instance, at the head of the St. Croix River, where there is a break, the lowest point of which is only 366 feet above the lake. On leaving the south shore of Lake Michigan and going east, the surface of the country gradually rises, till it attains, in the State of New York, an elevation of nearly 1700 feet above the sea. This plateau, both in the States of New York and Pennsylvania, falls off abruptly into the basin of Lake Erie, in a distance, in many cases, of six or eight miles. The head waters of the Ohio, the great eastern tributary of the Mississippi, rise within a few miles of this lake. In fact, all the great lakes have only a very limited area of drainage on their southerly shores. It is not till Lake Ontario is reached that the St. Lawrence basin becomes well marked. As the waters of Lake Michigan could, without great expense, be turned into the Gulf of Mexico, so could the waters of Lake Erie be conducted into the harbour of New York. The great plateau of the Alleghanies, a short distance from the outlet of Lake Erie, suddenly falls off into the basin of Lake Ontario. At the dividing line between the waters flowing into this lake and the Hudson River, it is depressed 145 feet *below* the surface of Lake Erie. It is through this great defile or depression in the continent, that the Erie Canal is constructed. The low level on this canal, which corresponds to

the crest of the Great Alleghany range, is 69 miles long. This canal is the eastern outlet for the great interior basin of the country, as is the Mississippi River of the southern. On going still farther northeast, another remarkable depression occurs in the general surface of the country, being that occupied by Lake Champlain. This lake is elevated only 87 feet above the level of the sea. Easterly of this depression, which extends all the way from the St. Lawrence River to the Hudson, the dividing line between the St. Lawrence and the rivers flowing into the Atlantic Ocean is a well defined and comparatively lofty mountain range.

The last grand division shown on the map is the Atlantic slope of the Alleghany mountain ranges. This is comparatively insignificant in extent, though at present the principal seat of the population of the United States, and of its leading commercial and agricultural communities. It extends from the Gulf of St. Lawrence to the Gulf of Mexico, embracing the two lower British North American Provinces. It has an average breadth of about 350 miles. This division is composed of belts of country very dissimilar in their aspects. With the exception of the New England States and the Provinces named, that portion of it lying immediately upon the sea-coast is low and marshy. The width of this belt varies all the way from 10 to 50 miles. This is succeeded by a more elevated, though comparatively depressed and level belt, composed of sandy plains, covered with pine forests. The slopes of the plateau from which rise the Alleghany Mountains are next reached, and with them, the most fertile portions of the Eastern States. The general elevation of this plateau is about 2000 feet above the sea. Upon this, the mountains rise to an elevation, in some cases, of over 6000 feet above the sea. The breadth of the Alleghany range of mountains will average from 200 to 300 miles. For the greater part of their height they are composed of several parallel ranges, having the general direction of the Atlantic coast.

As I did not expect to be called upon to make any remarks, such as I have made have necessarily been somewhat discursive, and totally inadequate to so broad a subject as the topography of the United States. The map now exhibited will supply the want of greater detail on my part. I have only attempted a brief outline. The map is based on the coast survey of the United States, conducted by Professor A. D. Bache, whose eminent scientific attainments, I am happy to know, are properly appreciated by your learned Society. The interior is compiled from the surveys of public lands of the United States, and the surveys of several proposed routes for railways across the continent, and surveys conducted

by the several States. It also shows 26,000 miles of railway in operation in the United States, and nearly 3000 in Canada, and some 8000 or 10,000 more in process of construction, and about 6000 miles of canals.

The PRESIDENT.—I need not say that we are very much obliged to Mr. Poor for his very lucid explanation of this large and valuable map. When he tells the geographers, who have just adjudicated their gold medal of the year to his distinguished countryman, Professor Bache, that this map is founded in great part on the coast survey, we know what value is to be attached to it.

2. *Notes on Borneo.* By Lieut. C. A. C. DE CRESPIGNY, R.N., F.R.G.S.*

A. *Ascent of the River Limbong.*

Labuan, Sept. 7, 1857.

DEAR DR. SHAW,—I enclose you a map or plan of the Limbong River, for the information of the Royal Geographical Society. May I beg you to send a copy to the Admiralty, as my time runs so short that I shall not be able to make one.

With regard to the Limbong, but little can be said of interest. I ascended it in preference to any other river, because it runs through a less elevated country than the others in the neighbourhood, and therefore its ascent at this time of year would be comparatively more easy, and because the late irruption of Kyans into the country about its upper parts created a desire to inspect the scene of their devastation.

I found the country on either side of this fine stream thinly peopled, and the inhabitants very poor. In the upper villages, among the Bisayans, the people lived, in addition to their rice, upon wild hogs and snails, principally the latter. The Malays near the mouth of the river, and for 50 miles up, cultivate rice and sago, but not much, for fear of becoming rich, when they would fall the prey of one of the numerous Bruni pangerans (feudal chieftains). The formation of the country appears to be sandstone, slate, clay containing iron, blue clay, fine loam, and decayed vegetable matter. I passed two rapids, the lower running over large pebbles of sandstone; the upper, sand and snags. I passed also the ruins of two villages destroyed by the Kyans, who, in number 3000, had taken 100 heads, and two others deserted by the inhabitants, who had moved lower down the river. In front of one of these was a rude wooden statue in honour of taking a Murut chief. I arrived

* See Proceedings, Royal Geographical Society, vol. i. p. 205, &c.—ED.

at Damit, the temporary residence of the Kyans during their descent on this country, and found the remains of 30 large temporary houses, capable of accommodating 2000 persons. I was struck with the fact, that most of the floorings, raised, of course, a few feet from the ground, inclined towards the centre, like our Crimean huts. I was informed by a wandering party of Bisayans, in search of hogs, that there was another encampment a short distance higher, and that I was within 30 miles of the place where the Kyans haul their river-boats overland from the river Barram into the Limbong. My provisions, however, ran short, and not a plateful of rice or a single fowl could be purchased from the poor victims. It had been my intention to proceed slowly down the stream and to make little excursions on either side at interesting points, but under these circumstances I was obliged to descend as rapidly as possible. I would, if I thought the Society would be interested, write a much more detailed account of my trip. I am about to sail in my prahu for Malúdu Bay, to pass the rainy season. In January, or soon after, I shall ascend the Barram.

Believe me very faithfully yours,

C. A. C. DE CRESPIGNY.

B. *Visit to Malúdu Bay.*

Labuan, Nov. 22, 1857.

SIR,—ACCORDING to previous determination, I sailed from Labuan in my prahu on Sunday the 13th of September, and, notwithstanding the very heavy weather, arrived off the mouth of the River Bongan, which flows into Malúdu Bay, on the evening of the 21st, without having experienced any damage beyond the loss of my boat and one anchor. I must confess that I was not a little anxious as to what kind of a reception would be given me—my former visit to the bay as a midshipman in H.M.S. *Dædalus*, twelve years ago, having been on a very different errand, and one of the only two Englishmen who had since approached it in peace having been most vilely murdered; but my arrival having become known, my mind was soon made easy by a visit I received the same evening from the Pangeran Badruddin, who came down the river accompanied by all the xeriffs, his sons, and nephews, to welcome me. I informed him that I was not a merchant, and had come to visit him, and, with his permission, to explore the country in the vicinity. The Pangeran promised me all the assistance in his power, and begged me to make his house my residence as long as I chose. “I shall only beg of you,” said he, “to allow me, when you return to Labuan, to

accompany you, as I wish to proceed to Singapore on a mercantile visit." To this arrangement I with pleasure acceded. We accordingly ascended the river on the following morning, and I took up my abode with the Pangeran.

There is no necessity to detail to you the conversation I held with the Pangeran: suffice it that I was charmed with his amiability, surprised at the extent of his knowledge of European affairs, and amused at the volubility with which he rattled out question after question upon all subjects. Who built the pyramids of Egypt? What is the population of China? How much did the Sultan of Turkey pay England for her assistance in the war against Moscow? I enlightened him to the best of my ability upon these and a thousand other points, one of which was—What is the cost of the Queen's dinner every day?—and in my turn derived much information from him respecting the neighbouring country.

September 27.—I walked twelve miles to Mausolug, the nearest Dusun village, accompanied by two of my Malays and a party of Dusuns, where I was heartily welcomed. I was much pleased with the inhabitants and their domicile; the men being well built and muscular, the women tolerably handsome, and very different in appearance to the wretched inhabitants of the Limbong, of whom I wrote to you in my former letter.

Their village, containing about 200 inhabitants, consisted of two long houses, like those of the Muruts and Bisayans, with this difference, that they are not so high above the ground and the front is quite open: moreover, everything is kept as clean as a new pin. Having submitted with a good grace to their curiosity—my clothes, my arms, myself, each in turn becoming the subject of animated discussion—the Dusuns then commenced their evening amusements, the men mending their river-nets, carving handles for their swords, tops for their spear-heads,—the women busy at their basket-work. I folded my rug around me about midnight, and from time to time drowsily opened my eyes as a burst of louder laughter struck upon the ear. At what time they retired I know not, but on my awakening on the following morning at early dawn I found my savage friends all up and busy pounding rice for the morning meal, and I am sure the Fellows of the Royal Geographical Society will be amused when they hear that near me were two children playing at cat-cradle exactly as I remember to have played it in my own childhood.

I wandered for more than a week among the mountains to the eastward of Mausolug, and then returned to Bongan, glad enough to get under the roof of a house once more, for the temporary huts

erected by the Dusuns among the mountains were not so impervious to rain as they might have been.

On October 16th I set out, in spite of the rain, on another expedition to the southward, with the intention of reaching, if possible, the Lake of Kinibalu; but, although it was only five days' walk, I found on the third day that the river was so swollen that the fords were impassable, and this, with the fact that three of my men were taken ill with diarrhœa, determined me to put off my visit, until a more favourable season, and content myself with gaining as much information as I could of the country in the vicinity. The name of the village where I was then stopping is Marak Parak, which contains about 300 inhabitants. It was with a sad heart that I turned my face again northwards towards Bongan, which place I reached in a few days, and on the 15th of November left the river and returned to Labuan.

Having given as succinctly as possible an outline of my excursion, I now proceed to give you the information I gathered of the country, and its inhabitants.

Geographically the two ranges of hills which enclose Malúdu Bay enclose also a tract of country extending 23 miles to the southward and 19 or 20 in a longitudinal direction. This is an alluvial district of about 450 square miles, the soil a red earth, composed of detritus of sandstone with decomposed vegetable matter, very favourable to the growth of palms. The Dusuns have a tradition of a time when the sea washed the foot of the mountains at Limbong Batu, where the delta of the Bongan may be said to have its apex. Into Malúdu Bay flow no less than 15 rivers, of which the principal are, the Binkoka on the east, inhabited by Bajaus, where there is coal; the Sugud, inhabited by Sulus; the Bongan, the only one of any length, by Malays; the Malúdu, by Malays; and the Tamiaru, exclusively by Dusuns. The banks of the other rivers are inhabited by Dusuns or Bajaus. The hills, which, rising at the extremity of each cape, gradually, as they approach the apex of the delta, gain an altitude of about 2500 feet, are composed of sandstone and shale, the ridges about 12 feet wide, the sides inclining at an angle of about 45°, in many cases very precipitous spurs of the mountains running out in all directions. From a height their appearance resembles the wash of the sea when the wind is against the tide, on a more extensive scale—ridge rising above ridge, spurs of mountains fouling each other, the whole a heap of confusion. In the delta are two small lakes, one in the neighbourhood of Bongan, two fathoms deep, two miles long, and fifty or sixty, occasionally a hundred, yards broad when the rains have been unusually heavy. The other

is of an oval shape, near the river Landik, two miles its greatest breadth, three fathoms its greatest depth; both are fresh-water lakes. The river Bongan itself, rising in the mountainous region of Kinibalu, is at its mouth not wider than 100 yards, and at full and change the depth is $1\frac{1}{2}$ fathom, which is maintained more than a mile out to sea, when the water deepens, so that small vessels only can enter the river. Within its mouth it is navigable for eight miles. The tide is felt about two miles from the embouchure, and the water is fresh at ebb tide half a mile from it. The mountains on the west of Malúdu are also sandstone. In one hill are masses of iron pyrites. Above Limbong Batu the hills on the left bank are of sandstone, and presented the same appearance as those first described. To the east of them runs the Bongan, here a mountain stream tumbling over the masses of rock that at various times have fallen down the side of the mountains into the river. The valley of the Bongan is from two to five miles wide. Beyond that river are the Natu Hills, beyond which flows the Natu River, which joins the Bongan a little above Limbong Batu. To the west runs the Buam River, which joins the Malúdu a little below. Beyond it the Buam Hills are 2500 feet high.

At Marak Parak I first observed granite, large masses of which lay in the bed of the river, together with syenite, serpentine, and sandstone. The banks of the river, in some places 20 feet high, were composed of a conglomerate consisting of large round pebbles of sandstone, and other stones of the above description, embedded in a hardened clay, now indeed as hard as the stones themselves. This conglomerate was evidently in former ages deposited by the river itself, which has since worked its way into a deeper channel.

The Dusuns brought me pieces of crystal, of mica and of green soapstone, but, as they set a, to me, fabulous price upon them, I did not purchase any.

Marak Parak is situated at the foot of M. Kapokan, 8000 feet high. I did not ascend it very far, but in all probability the granite formation here first shows itself, as, although the base was sandstone, the mountain did not present the same appearance as those of the north. By observations and cross-bearings I found myself much to the east of where I should have imagined the river to run, Mount Kinibalu bearing from me w.s.w. I had thus, as it were, got on the other side of the mountain, as it appears from the sea, and here I received information of the lakes. The appearance of Kinibalu from this vicinity is that of a huge mountain rising abruptly in the west, its crest sloping away gradually to the east, until it is lost sight of behind the tops of the nearer hills. Between

this range and Kapokan runs the river Sabuk. I should think it not unlikely that the principal ridge runs on and forms the peninsula of Ungsang, whilst other ridges, from the common parent, probably enclose the various great bays on the east and to the north of Ungsang.

Here, to my surprise, I found that I was not the first European who had travelled this way, for an old man called upon me one day, and, after some conversation, informed me that he perfectly remembered the fact of two white men from Balambangan coming to Kinibalu. "They could not manage to ascend it," continued he, "but they walked pretty nearly all round it." He informed me that there are two lakes, one halfway up the mountain, from which flow the rivers Bongan, Labuk, Luwanan, Kimbatungan, and Lampasuk, across which a man in a canoe might paddle in half an hour; the other, a very large lake to the south of Kinibalu, with many people living on its shores, and that the lake was salt, which I doubt.

In answer to my inquiry, the person in question said that the people on the other side of Kinibalu were very bad men, and killed every one who approached them. I said I had heard the same account of his fellow-countrymen, and he shook his head in deprecation of such a wicked report. However, there is a feud between the people on the north of Kinibalu and those on the south; also between the first mentioned and those of Mausolug, the place I first visited.

The inhabitants of this region, the Dusuns, or, as they are also sometimes called by the Malays, Idäan, are, for the most part, a fine, well-made, and not unhandsome race; the men muscular and well developed; the women, when very youthful, positively pretty, except their black teeth, but those above the age of 20 are worn out with the hard work assigned to them, pounding padi and carrying wood and water. Their dwellings are similar to the long houses of the south, except that the front is more open, as they are not afraid of the invasion of their hereditary enemies, the Dusún Tamis, living on the south side of Kinibalu. They have no written language, nor idea of time beyond the return of the seasons, and they know not even their own age. They have not, so far as I could discover, any religion, but they revere the name of Kina, their first leader, who having brought them to this land from another, ascended the mountain Kinibalu, and was no more seen of men. They also kept in remembrance the name of Hungsum-ping, the brother of the Emperor of China, and Malekbatata, from the same country, whose names are connected with a curious legend.

I could see no similarity of features between this race and the Chinese, except that in childhood the upper eyelid is turned in, so that the eyelashes appear to protrude from the eye itself. There is also a peculiar feature which assimilates them to the negroes of Africa, viz. the protuberance of the shin-bone, which in children is slightly arched outwards—a peculiarity which, with the first mentioned one, disappears with years, for the limbs of the young men are as well proportioned as a Spaniard's or an Irishman's. The taboo is also practised among them. The cases which came under my observation were, that of a house in which lay a dead body; and another whose inmates had had a great sowing of padi. Doubtless there are other causes of taboo, of which I am at present ignorant. These people do not preserve the heads of their enemies, and the only parties among them who tattoo are those who have killed an enemy. The tattoo is invariably a broad band from the navel up to each shoulder, where it ends abruptly. A smaller band is carried down each arm, and a stripe drawn transversely across it for each enemy slain. I am happy to say I saw but few men tattooed, but one young fellow had no less than 37 stripes across his arms. Upon my inquiring as to where he had been so fortunate, he pointed towards the river Labuk. There appears to be no particular disease prevalent among these people. Very few were affected with skin disease; no appearance of smallpox, and, although the Malays of Bongan were nearly all suffering from weak and inflamed eyes, I did not observe one instance of this distressing affliction among the Dusuns. A few cases of consumption came under my notice both among the Malays and Dusuns. With regard to their numbers, if the whole district is as thinly peopled as the parts I visited, there cannot be more than 12,000 in the whole tribe or nation. How it is that, with a well watered country, a healthy climate, peaceful occupations, and a perfect independence—for their freedom, unlike that of the Dyaks of the south, is not at all affected by the proximity of the Malays—they have not increased and multiplied to a greater extent, I am at a loss to conceive.

The language spoken by the Malays of Malúdu Bay differs a little from that spoken at Bruni, many words being borrowed from the Sulu—such as *timus* for *garam*, salt; *piasan* for *kalapa*, cocoa-nut; and others—while the pronunciation differs in these respects, that the sound *ch* is always pronounced *s*—as in *kuching*, a cat, which becomes *pusing*. Here, also, the Orang-utan (which is very common) is known by the name so familiar to English ears: the word "*meias*," given by Sir J. Brooke as the name of this ape in the languages of the Durgahis of the north-western coast, is not

understood by them. The language of the Dusuns sounds at first, from the frequency of words having the accent on the last syllable and not as usual in Malay on the penultimate, unpleasant from its roughness, but after a little while it is not unmusical to the ear. Some words are identical with the Sulu, many with the Malay, and others very similar to the latter. The prefix "meng" is common in their verbs, even when the words are different from Malay. I did not remark any affix such as are frequent in the latter language.

In their social institutions the Dusuns or Idäan are cleanly in their habits, and their dwellings are neat and tidy in the interior.

I was present at a birth, a marriage, and a death. No ceremony took place on these occasions, but after the birth, the mother died in a few hours from hemorrhage and exhaustion. When there was no doubt of her being in a dying state, she was brought out of her little cabin, and laid in the general long room or verandah, where all the people gathered round her and commenced a howling chorus which emulated that of a troop of their own dogs, and which was continued until the spirit had fled. The marriage I spoke of was performed by torch-light; a hog was killed and a feast held, after which a chorus was sung by all the women and children for several hours, which was really very pretty, but of its purport I am ignorant, and the happy couple were at length dismissed with loud acclamations.

Concerning the produce of the country I can say but little. Rice of a good quality is grown on the slopes of the mountains. Of fruit there was but little, the cocoa-nut, jack-fruit, mango, and banana, with a small durian, making, I believe, the sum total, and these in but small quantities. Of vegetables, the small sweet potato and the onion mark the beginning and end of their knowledge. Tobacco of an excellent quality, and highly esteemed by the Malays, is grown in larger quantities than nearer Bruni. The forests produce a little camphor and a little bees'-wax, much damar, two kinds of gutta-trees, and perhaps even more, caoutchouc, rattans of great length, and probably many more useful commodities which my want of opportunity prevented my observing.

I am not prepared to say anything definite on the subject of trade at present, except that I have met in the course of my journey in the north many native traders and others from the eastern portion of the Archipelago. My next trip will probably be to some of the rivers on the eastern side of Borneo, and on my return I trust to be able to communicate to the Society some interesting information. If I had but a gun-boat, or, better still, such a steam-boat as they

have built at Bristol, in two parts, for the Australian rivers, I might defy a fleet of pirates, with which those seas are now more than ever infested; but in my poor, defenceless, crazy old prahu, I confess I look forward to the day of my return to Labuan with some little degree of anxiety.

I enclose a map of the country I traversed, for the information of the Society.

I remain, &c.,

C. A. C. DE CRESPIGNY, R.N., F.R.G.S.

The PRESIDENT.—I am glad to see you applaud this communication, because when our young friend, Lieut. De Crespigny, started upon his most perilous adventure he certainly undertook an enterprise which seemed almost Quixotic, for he received scarcely any assistance, and had merely permission to travel from the Admiralty. He had, however, the goodwill of the Society and our "Hints to Travellers." Now, without knowing anything of the interior of this vast country, of which, indeed, geographers were entirely ignorant, this Lieutenant of her Majesty's navy undertook to explore this remote region, and I think you will agree with me that he has exhibited the spirit of a true geographer, and that we ought to thank him heartily for his communication.

3. *Account of an Expedition from Damara Land to the Ovampo, in search of the River Cunene.* By MESSRS. GREEN, HAHN, and RATH.

A LETTER from the Rev. C. Hugo Hahn, dated Barmen, October 7, 1857, has appeared in the 'Cape Town Commercial Advertiser,' describing the disastrous issue of a journey taken by himself and his colleague the Rev. Mr. Rath, together with Mr. F. Green, from Damara Land to the Ovampo, in search of the River Cunene. A published letter from the latter gentleman has also been received.

The missionaries pursued the track of Mr. Galton and Mr. Andersson as far as the Omoramba K'Omanbonde, where they left it and followed the river bed. After a few days they unexpectedly met with Mr. F. Green, who also wished to travel to the Cunene, and who informed them that the Omoramba ended abruptly, about 40 miles farther on, in a sandy soil. Consequently the two parties joined together and proceeded northwards. They ultimately fell in with another river-bed running N.W. (I believe the bearings to be magnetic) and they followed it. This brought them unexpectedly to a small lake situated about 32 miles E.S.E. of the Etosha salt pan. It was well stocked with flamingoes, pelicans, and other water-fowl, and its circumference was judged by Mr. Green to be 20 miles. It is called Onondova, is occupied by Bushmen tributary to the Ovampo, and is the frontier of the pasture-grounds of Ovampo land. Mes-

sengers were sent from Onondova to Nangoro, the King of the Ovampo, asking permission to visit him, and a travelling party of Ovampo were afterwards met, whose leader undertook to conduct them to his village, saying that it was his special office to introduce strangers.

On entering Ondonga, the fertile district of Ovampo land, they were met by one messenger after another, sent to them by Nangoro, and were received cordially and respectfully by the people. The caravan consisted of 4 waggons and 100 loose oxen, besides those yoked to the waggons, and about 30 Damaras. Just before reaching Nangoro's house their guide told them that the king desired their assistance in an expedition against a small neighbouring tribe with whom he was at war. At this request the missionaries were surprised and disgusted, and refused indignantly. The guide took it very quietly, and immediately allowed the subject to drop; but, from that moment, there was an evident change in their mutual relations. Nangoro would not see them for five days, and when he did so he gave them a cold reception and flatly refused to allow them to proceed farther. Mr. Green's account of their reception in Ovampo land is as follows:—

“The guide appearing a frank and honest fellow, we gladly placed ourselves under his directions; and as he was very communicative—added to which, a shrewd character—we became rather disposed in his favour. Upon our arrival at the chief's residence, he appeared to be a complete master of ceremonies; our messages, together with our presents, were delivered by him, and the custom of lighting our fire from that of the chief's hearth was strictly attended to and executed with a little skill of witchcraft by him. Our first present was returned, with a message that whatever we intended to give his royal highness, besides the beads, must be despatched at the same time. We became exceedingly annoyed at his impertinence, and told him very plainly that it was our custom to send presents in that way, and he must conform to it; that in sending the present back he did not appear to be on friendly terms with us, and we did not like it; that if we had anything further to give the chief, we should do so after we had the honour of seeing him, ‘if his words were good for us;’ if not, we should not give him anything more. I was determined not to allow myself to be imposed upon by this beggarly chief, which was also the same in Mr. Hahn's case. (Mr. Galton allowed himself and party to be sadly imposed upon by Nangoro, which induced the latter to make a like attempt upon us.) This returning of presents was at length amicably settled, but we had occasion to be exceedingly angry at the non-appearance of the chief; after we had been at his town for three days, and sent a message to inform him that we were not accustomed to wait the pleasure of a chief so long, and that if he did not come the following day we should inspan and ride away—also, that if he considered himself a great chief, then so did we. This message appeared rather to astonish his highness, and we shortly received a reply, that we must not imagine that it was done with any evil design, but it was a custom from the day he was born, and that he would come and pay his respects the ensuing day. He kept his promise, and we were not sorry when we were rid of the company of this fat old man.”

Many incidents occurred while the party was encamped near Nangoro which aroused suspicion and great alarm, the Damaras were exceedingly afraid, and appeared in momentary expectation at all hours of the night and day of being surrounded by the Ovampo and massacred; but no overt act was committed until the party prepared to leave:—

“On the morning of the 30th of July we yoked in the oxen at daylight, and made a start just as the sun was making its appearance above the horizon. To guard against their opposing our exit from Ondonga, our caravan was arranged as follows:—the loose cattle and donkeys were kept in advance, under an escort of all the available Damaras; after which came the four waggons, that of Mr. Hahn bringing up the rear. As I still retained a horse, I was mounted, and continued with the cattle in advance. We had not ridden many hundred yards when a party of the Ovampo came running from the direction of the chief's village; one of the sons of the latter asked both Mr. H. and myself if we were going, to which we replied that we were; shortly after, the ‘war cry’ resounded on all sides. Some made a rush forward for the road to bar our progress.”

Mr. Hahn went unarmed to one of Nangoro's sons whom he recognised in the crowd and expostulated with him. This had a slight effect in checking the demonstration, but shortly after there was a cry, and Nangoro's son had driven his assegai through the back of one of the Damaras; the poor fellow dropped, but as he fell he fired off both barrels of his gun, killing an elder son of Nangoro and another man, besides wounding his murderer. This was the critical moment. Mr. Green says—

“I rode forward to meet one man, more daring than the rest, who was stealthily approaching with his javelin quivering in his hand; I suddenly dismounted, and, whilst he sat thinking to escape the bullet, with a well-directed and steady aim I shot him; and the words ‘blood for blood’ rested on my lips. It was the first fellow-creature I had ever killed. There remained nothing more but to fight for my life, and that of the people I had brought into danger—and I was determined to sell it dearly.”

About noon the Ovampo had desisted, and Mr. Hahn having most fortunately heard, only the night before, that uninhabited plains might be reached at no great distance in a s.w. direction, that course was adopted; and ultimately, after a forced march of 3 days and 2 nights making a wide circuit, they reached the Otjihako wa Motenya utterly exhausted. The missionaries appear to have reached Barmen without further disaster, and Mr. Green dates his letter from the shores of Onondova, the new lake.*

A letter of Mr. Ch. J. Andersson has also been received, in which he announces his intention of himself starting for the Cunene. He

* Mr. Green's courage and skill as a marksman contributed greatly to the repulse of the Ovampo; and Mr. Hahn's testimony to his services is most cordial and unreserved.—Ed.

adds that he is wretchedly equipped, but that rather than lose the season he will start at once.

MR. GALTON, F.R.G.S.—I must express great regret at the tenor of a large part of this account. I quite gather from Mr. Green's letter that he adopted a domineering tone towards the Ovampo, which I believe to have been eminently injudicious, to have been construed by them as a menace, and to have been resented in the way we have heard.

In passing judgment on the conduct of the Ovampo, we must try and place ourselves in their position. Their territory is visited, almost invaded, by a strong party of foreigners, who are judged to be kindred to the Namaqua chiefs from their colour, language, creed, and intermarriages; and the Namaquas are a race of marauders, who have lifted cattle from the very borders of Ovampo land, and are known to be awaiting a favourable opportunity for invading that country. These foreigners are fully armed and dictatorial in their ways; they refuse to give those presents which are well described as taking the place of customs duties in African nations. They show scant courtesy to the king, and they very probably trespass in not a few of the many requirements of a witchcraft ceremonial. Why, if such a thing could be imagined as that 30 or 40 headstrong Englishmen were to make a sudden descent upon the shores of a continental power, at a time when war seemed to impend, professing peace but armed to the teeth and ready to fight, unfurnished with any kind of credentials, violating quarantine laws, setting all authority at naught, and coming for no conceivable purpose except that of making an armed reconnaissance, I presume they would have been treated by the nearest inhabitants or military guard in a not less hostile manner than this exploring party has been by the Ovampo. As to the treachery of which complaint has been made, I do not see that it is proved, for the expedition was treated with little favour. Or, even if it were proved, that it would make the attack much more difficult to excuse. Treachery is not so black a crime in the morale of African nations as it is in our own; we must also recollect that it is a last resort of the weak against the strong, such as the Ovampo suspected they might be before the much dreaded guns of their unwelcome visitors.

Mr. Green remarks that I was imposed upon by Nangoro in the matter of presents; but, on reading his list of gifts, I find I do not deserve the credit of having been so liberal as himself, yet I had the good fortune to conciliate where he had not, and I was able to leave, in peace, the happy country of a noble and a kindly negro race, which has now, for the first time, been confronted and humbled before the arrogant strength of the white man.

MR. MACQUEEN, F.R.G.S.—Mr. Hahn, the missionary's account is chiefly valuable on account of the considerable fresh-water lake that he discovered, and which he places in $18^{\circ} 45'$ s. lat. and $17^{\circ} 30'$ E. long., which is probably not incorrect. The lake is fresh water with plenty of fish. In circumference it appears to be about 30 miles, but to the w. no shore could be seen. Nearly in this portion of Africa all the old geographers place a lake. As the dry season was far advanced when Mr. Hahn saw it, it probably never dries up, and may be considered to communicate with the river that joins the Cunene to the N. of Ondonga, the capital of Ovampo, ruled by Nangoro or Nangolo. This chief bears a very bad character amongst all his neighbours to the N. and N.N.E. He treated Mr. Hahn very ill, and attempted to murder him and all his party after they left his capital. But they fortunately made their escape after the loss of some of their party.

The lake in question is situated about 30 or 40 miles N. of the junction of the rivers Omoronda and Omorabondo, which contain little water in the dry season. Both these rivers are mentioned and delineated by Mr. Galton, and Mr. Hahn mentions another river also called Omoronda lying considerably to the E. of the last named Omaronde, and which he says runs E.N.E., and forms

the Tioghe. This is not improbable, as a water-parting seems to run from 18° to 19° E. long., in this portion of Africa which separates the waters which run into the Atlantic from those that run eastward to the Liambaye or Liambige and the Indian Ocean. Vast copper mines are found about 100 miles E.S.E. of the lake mentioned, and the carriage of the ore forms a great trade to the people of Ovampo.

The intention of the party was to proceed N.E. to a place or chief named Libele, whose abode is to the S. of Bunda in about 16° S. lat. and 21° E. long. In this portion of Africa snow is stated to be found on high mountains in July and August. In the direction alluded to they expected to reach the Cunene, but which they never could have done, as the meridian of the upper part of that river is in about 17° E. long. Their course would have carried them across the Cubango, and its tributaries which form the Chobe, a great feeder of the Liambige. But they durst not venture to proceed from Ovampo in that direction, as at that season of the year water cannot be found for a great distance. Brocheda and Ladislaus, who both visited this district, the former in 1849 and the latter in 1852 and 1853, tell us that this district of Africa between Ovampo and the Cubango, including the great state of Quanhama on the S.W. side of that river, and called also Aimbiri from the name of the chief, is very dry in the dry season of the year, and generally a plain or level table-land with scarcely a stone to be found in it. Copper and iron are most abundant throughout it, and good water is frequently found in very deep holes, the remains of the floods in the rainy season from November to April, when the rains are very heavy. Both Brocheda and Ladislaus mention the great river Liambaye or Liambige running to the eastward, and that the country in that part of its course had been overrun and conquered by the Makololo, or as Brocheda, perhaps by an error of the Portuguese press, calls them, the Makakotto. The population of the portion of Africa here specifically alluded to are represented by traders and travellers who have visited them as extremely rude, ignorant, and barbarous.

4. *Journal kept during the performance of a Reconnoissance Survey of the South District of the Province of Otago, New Zealand.* By J. TURNBULL THOMSON, F.R.G.S., Chief Surveyor, Otago.

IN the beginning of 1857 Mr. Thomson explored, in successive trips, the southern extremity of New Zealand, travelling on foot over 1500 miles of difficult country, carrying his theodolite and "swag" of clothes on his back, and driving pack horses laden with flour.

The epitome of his results is contained in the following Table.

Nature of Country reconnoitred between the Waiau and Matuaru Rivers, and the UMBERELLA, EYRE, and TUKITUNO MOUNTAINS.

Square miles.				POPULATION.			
Forest land	..	..	570	<hr/>			
Moss and swamp	..	..	108	Europeans	..	..	253
Agricultural	..	..	400	Half-castes	..	..	70
Pastoral	..	..	2150	Maoris	..	..	119
Barren (mountainous)	..	..	500	<hr/>			
Total	..	..	3728	Total	..	..	442

There is also a table of barometrical altitudes and a comparative vocabulary of Maori and Malay words. Numerous latitude observations are alluded to, but do not appear in the present paper.

A large part of the country traversed, was utterly destitute of man; the white race not having reached so far, and the aborigines (the Maori) having abandoned it. There are marks of the previous existence of the latter in numerous small ovens scattered about the country; those that are on the skirts of forest land were usually found complete and apparently recent, those that are in the open country were broken and very old. Mr. Thomson remarks that natives would always build their ovens where wood was abundant, and argues that there has been a gradual diminution of forest land, and that ovens have been successively built on the borders of the forest as it gradually receded. Now the edges of the forest are choked with scrub grasses and ferns, which, on being set fire to, burn vigorously, destroying to various depths a fringe of the adjacent trees. In about three years' time, grass takes the place of the burnt scrub; scrub ultimately takes the place of the burnt forest; and thus the forest has a constant tendency to retrograde where fires are frequent, either from accident or design.

Other marks exist which have frequently been ascribed to the handiwork of aborigines, but which our author traces to an entirely different source. They are small mounds, sometimes heaps of stones, with little or no earth, which are scattered promiscuously about the country. On one side of them, is invariably a hollow. He attributes them to fallen trees, that have uprooted a large quantity of earth, which is left as a heap after their complete decay, the rains having washed out more or less of the earth and left the stones where they were. The hollow is the place where the root formerly stood.

There is much grandeur in the scenery of the part of New Zealand traversed by Mr. Thomson. The higher course of the Matuaru, its fall, and the Dome Mountain are especially mentioned. The Dome is only 4505 feet high, but it commands a grand and extensive view from the eastern to the south-western coast, and embraces the serrated edges of the Eyre Mountains, covered with snow. The height of the snow-line is not mentioned, but on Mr. Thomson ascending the Dome, and also an adjacent peak of much the same altitude, on the 15th of February (corresponding to our 15th of August), when the day was a hot one on the plains below, water froze during the time he was making his observations, in the one case at 10 A.M. and in the other at noon.

Mr. Thomson has collected some facts, which give hope that the

great bird, the Moa, may yet exist. Between the Waiau River and the West coast the country is covered with forest up to the snow line. It is a tract of 100 miles N. and S. and 50 miles E. and W., and here, and here only, are there hopes of finding live specimens of the gigantic bird the moa; and considering the very recent indications of its presence, everywhere found in the vicinity, the supposition of its existence at the present time, at least, has grounds for entertainment.

Jacob River settlement deserves some notice. It formed one of the many whaling stations that formerly studded the coast of New Zealand, and is now probably the only place where whaling is still carried on. Twenty or thirty years ago, when whales were numerous, vessels came here from Sydney and Hobart Town, but owing to the savage character of the natives, the captains of the ships kept as much aloof from them as possible, and selected stations that were naturally safe from sudden attacks. Codfish Island was the best of these; it is situated in a stormy sea, with only one landing place, and in a convenient position for whaling and sealing.

The natives of the coast, and of Centre Island and Raupuki, were 3000 to 4000 in number, and warlike as they were, were nevertheless inferior in strength to the northern tribes, who made constant raids upon them. Consequently they were driven to the islands from motives of fear similar to those which made the whalers select Codfish Island as their station. Friendly relations and intermarriages between the whites and the aborigines soon followed, and, as a fruit of their mutual confidence, the white man began to extend the scene of his enterprises along the coast, other settlements were formed, and Codfish Island fell into secondary importance. These new settlements were The Bluff, New River, Waikawa, Jacob River, &c., and they all flourished so long as whales continued plentiful. But a change took place, the whales were nearly exterminated and the remainder deserted these waters. The native race declined rapidly in number; measles alone swept off two-thirds of them, and other imported diseases were very destructive; at present the natives of these parts do not exceed 400 in number.

Centre Island is deserted; a few natives live scattered among the settlements, but the principal remnant is at Raupuki. As to the Europeans, such as had not contracted ties with the natives removed elsewhere, the others eked out a dull existence; their native wives tilled the ground, and now and then a ship called, ready to exchange tobacco, &c., for potatoes and fresh pork. Such was the condition of this part of New Zealand, until within the last two years, when

the purchase of the country from the aborigines opened it out to civilization. But Jacob River was an exception: it had been kept from the fate of the other settlements, mainly owing to the energy of Mr. Hanwell, who imported stock from Australia, sent whaling and sealing expeditions to the almost unknown West coast of New Zealand, and encouraged such branches of industry as were available. The inhabitants are now remarkably thriving. Mr. Thomson draws a close parallel between the present condition of Jacob settlement and that of the Shetlands many years since, as described by Sir Walter Scott; there is the same seclusion from a more stirring world, the same pursuits and the same social condition. The west of New Zealand is the scene of their whaling and sealing enterprise; its coast is remarkably stormy, but sounds and promontories alternate in such close succession that harbours of refuge are everywhere to be found. The water is exceedingly deep close in to shore, and vessels frequently moor to the trees, where they are securely protected from wind by the steep cliffs. The natives of Jacob's Town profess Christianity; they dress and build cottages in European fashion, and these, by the way, are remarkably tormented with fleas.

Finally, Mr. Thomson draws a humorous comparison between the occupations and way of living of an officer on the Indian survey (in which he formerly served) and those of his present employment. Notwithstanding the rude work of the latter, he considers the health and hearty enjoyment of life to more than compensate for the absence of luxuries, from which the languor of an Indian climate had removed the zest:

5. *On the Fine Regions of the Trade Winds.* By THOMAS HOPKINS, M.B.M.S., V.P. of the Manchester Literary and Philosophical Society.

MR. HOPKINS' paper is a sequel to other writings,* in which he has proposed a new theory upon the causes of trade winds and monsoons. It is not specially explained in the present communication, but as it is alluded to, throughout its pages, a concise description of it becomes necessary. Mr. Hopkins denies many of the facts usually quoted in support of the commonly received Hadleian theory; he adduces others, which he considers to be at variance with it, and maintains that the prime mover of these atmospheric phenomena

* See Journal of the Royal Geographical Society, vols. 26 and 27; and Transactions of the Royal Society.

resides in the influence of certain vast mountainous tracts, which produce an indraught of air from all sides, owing to causes we will proceed to indicate. These mountainous districts condense the moisture of the air that impinges upon them in large quantities, and Mr. Hopkins considers that condensation of moisture lightens the air, and therefore causes it to rise, for two distinct reasons: the one, that it has become specifically lighter owing to its loss of water; the other, that it is warmer, and therefore more rarefied, than other air at the same elevation as itself, owing to heat given out by the act of condensation. If these postulates are acceded to, it follows that we have a system of ascending currents, an indraught of winds to feed them, and a consequent escape and overflow of dry air in the higher regions. The present paper suggests, rather than undertakes an enquiry into the localities, where the dried air again reaches the earth in fulfilling its circuit.

“The best evidence we have of the immediate source of the air in the trade winds of the Pacific is to be found in its degree of dryness. All accounts represent them as being at first, and to a considerable degree, accompanied by a clear sky, but I have met with no register of the humidity of the air. The researches that are now in progress by Americans, as well as English, to improve our knowledge of nautical geography will probably give fresh information; but it is particularly desirable that there should be registrations of the wet and of the dry bulb-thermometer in the parts treated of. If we were in possession of such registrations over a few lines of the Pacific from E. to W., a fair inference might no doubt be arrived at respecting the sources of the great masses of air which constitute the trade winds of this ocean.”

Quotations are then made from various well known authors, Dana, Melville, and Darwin, to show the extent over which the fair weather of the trade winds extends, both in the Pacific and the Atlantic.

Over both these oceans Mr. Hopkins considers that the currents in the higher regions pass in an opposite direction to those below, but that elsewhere, as in the Indian Ocean, the case is probably different.

“It is not necessary that we should presume that the air which descends in a fine locality has come from the terminus of the same wind that it feeds. The proposition is that air which has been dried by condensation of some of its vapour, in high regions, descends in some other parts to the lower regions as dry air, making the locality fine, but it does not follow that it must descend to feed the *same* stream that had furnished it.”

“Condensation of vapour, by irregularly disturbing the atmosphere at various heights, puts the air in motion at those heights, making it ascend in one part, and it must come down in another. Some of the areas of ascension have been described, and a few of descent, but there are innumerable others spread over the surface of the globe, every hill or place, where heavy rain falls, being to some extent an area of ascent, with the wind that blows towards it coming directly or indirectly from a region of descent. The whole aerial

ocean to a considerable height is thus kept in a state of motion and change, and the invisible elastic vapour which is sent into the atmosphere by evaporation, in one part, comes down as rain in another. The different quantities of vapour condensed in equal times in different localities, and the elevations at which the condensation takes place, modify the movements of the air in various degrees, and in all conceivable ways, but the nature of the processes is always the same."

6. *On Dr. Rink's Remarks respecting the supposed Discovery by Dr. Kane of the North Coast of Greenland and an Open Polar Sea.*

The PRESIDENT.—I have, Gentlemen, now to call your attention to a subject which, although at first sight it might appear untoward to the American gentlemen, Mr. Poor, Professor Alexander, and any others who may be present, will, I have no doubt, when properly explained, satisfy them that the feeling of vexation which has been expressed at New York, has solely arisen out of an inaccurate newspaper account of what took place at a former meeting of this Society. You will recollect that at the meeting of this Society in April a paper was read, as sent to us by Dr. Henry Rink, the Danish Lieutenant-Governor of South Greenland—a gentleman extremely well acquainted with the glaciers of that country. In that paper, whilst making some comments of a critical character on Dr. Kane's work, he questioned the accuracy of the determination of the extreme north latitude fixed by Morton, one of Dr. Kane's party. Upon that paper being read, two of our distinguished Arctic explorers, Sir George Back and Captain Collinson, made observations which led to a conviction on the part of Mr. Arrowsmith and the practical geographers who had studied the subject, that the extent of northern latitude claimed by Dr. Kane, on the observation of his steward Morton, must be reduced.

Upon that subject I will request the Secretary to read a letter from Professor Bache, who completely justifies the main conclusions at which our nautical men had arrived. In fact, the only difference between them and the Professor amounts to some seven or eight miles. Now, if that is all the difference existing between the American version and our own, it is surely undeserving of attention.

My chief object, however, in calling attention to the case is to state that throughout all the observations made on the former evening, not a single individual disparaged in the slightest degree the great merits of that illustrious traveller, Dr. Kane. We all truly admire him; and during the short period he was amongst us, every person who saw him, loved him. We gave him our gold medal, have done him all the honour in our power, and having striven to record our high sense of his great and noble achievements, it was impossible that we should disparage his merits.

Mr. Jay, in his letter to myself, uses words employed in a newspaper. Now, I must declare from the chair that that statement is most inaccurate. Had the statement been correct, our American friends would have had reason indeed to be offended. Dr. Shaw will now read the letter of Professor Bache addressed to the Hon. G. M. Dallas, the American Minister :—

Washington, W. C., May 6, 1858.

MY DEAR SIR,—As desired in the note addressed to you by Dr. Norton Shaw, under date of April 13, 1858, I have caused an examination to be made of the data for Morton's northing in the expedition in which he saw the open Polar Sea. I selected for this

purpose Charles A. Schott, Esq., Assistant in the Coast Survey, who was chosen by Dr. Kane to reduce many of the results of his observations, and who is very exact as a computer, and has remarkably good judgment in regard to data.

Dr. Kane states in his 'Narrative of the Second Grinnell Expedition,' Appendix V., vol. ii., that the positions given to Cape Jefferson by dead reckoning and by astronomical observations differ by 43'6" of latitude, and that he had adopted a mean of the results by the two methods, instead of that given by either method singly.

Mr. Schott reports that, "After verifying the astronomical data of Capes Jackson, Madison, and Jefferson, they were plotted, and the shore line run in accordingly, supported by some available bearings. From Cape Jefferson the bearing to the northernmost cape reached (Cape Independence) is by compass N. 148° E. or N. 40° E. true, distance 17 nautical miles. Consequently, if we base the shore line on the sun's meridional observation, and not upon the mean between the dead reckoning and the astronomical observations (as Dr. Kane has done, and so stated in his 'Table of Positions,' Appendix VI.), we trace the shore line as shown in red ink on the accompanying sketch, and Morton's greatest northing (at Cape Independence) becomes 80° 53' (81° 12' by chart in vol. i. of the 'Narrative').

"That Dr. Rink has deducted too much by placing Cape Constitution in 80° 44', and hence Cape Independence in 80° 41', is plain from the fact that Morton observed the sun in 80° 41' at noon at Cape Jefferson, a point nearly 12 miles to the south of Cape Independence.

"Believing the astronomical observations to be entitled to greater confidence, 80° 56' for the latitude of Cape Constitution should be adopted in preference to 81° 15', as given on the chart in vol. i. In no case, however, could a latitude lower than 80° 53' be assigned to it."

The conclusions in regard to the open Polar Sea do not depend in any way upon this difference.

With great respect and regard,

Very truly yours,

Hon. George M. Dallas,

A. D. BACHE.

Minister of the United States to Great Britain.

CAPTAIN COLLINSON, F.R.G.S.—I am particularly glad that this subject has been amicably adjusted. As geographers we must pay attention to observations, and not to reckoning. A Flemish yard or a Dutchman's foot is of no value in

estimation when we can fix a geographical position from astronomical sources. Professor Bache's letter suggests a point as the farthest limit of Morton's journey, which differs so slightly from the conclusions we have arrived at, that there is no necessity to raise a discussion about it. But I should like once more to pay a tribute to the memory of that noble man who we may almost say sacrificed his life in order to rescue our fellow-countrymen (hear, hear); and I am sure you will all join me in this mark of respect to Dr. Kane.

The PRESIDENT.—I would observe that the remarks had reference only to the supposed imperfect observations of Morton, the steward. The whole question turned upon that point, and had no reference to what Dr. Kane himself had observed. I ought to have mentioned that, in consequence of the inaccurate report in the newspaper, the Geographical Society of New York passed a resolution instructing Mr. John Jay, their Foreign Corresponding Secretary, to ask this Society to favour them with a copy of Dr. Rink's paper, and also of the remarks of the gentlemen who took part in the discussion.

Now, as Mr. Poor is present, I can assure him that he will obtain the fullest explanations from the gentlemen who did speak on that occasion, as well as a copy of the paper that was read; and I hope that he will return to his own country with the assurance that there was nothing said or imagined which in any way reflected on the truthfulness and ability of Dr. Kane.

PROFESSOR J. H. ALEXANDER, of the United States.—It was only a few moments ago I was made aware that this subject was coming up. Therefore, I am not acquainted with the facts except as they have been mentioned to the meeting. I can only say as an American, in which character you, Sir, have done me the honour to call upon me, that the expressions of Professor Bache, the hereditary friend of Dr. Kane, as I may be claimed also to be myself, seem to me to cover the whole question. In the first place, it should be borne in mind that Dr. Kane was not an astronomer and geographer by profession, but a physician in the United States navy. The impulse of his own feelings and love for science carried him in this direction, after having led him first very far south in Mexico, where he made explorations which did not yield in adventure and interest to his voyage to the Arctic regions. The same impulse bore him to the north, but without the precise technical education which would make his observations entirely reliable. Therefore, if he did make a mistake as to a distance of a few miles, I do not think it a matter of very great importance. The great merit of Dr. Kane—the merit which we as Americans principally recognise—is the animus, the disposition he showed (hear, hear), and the great general results he gave us in extending our knowledge of the geography of that great Arctic region. Further than that, I would say it appears to me, as a man of science, in which character you have also referred to me, though I have very small claim to it, and at most can only ask to be considered as a *lover* of science, that the claims of science are not bounded by any country. Science requires precision when she comes to details and observations, whether made by Americans or Englishmen. Therefore I am happy to see that, after the judicious and fair sifting which these observations of Dr. Kane have undergone, no greater error has been discovered, so that any of us, should we be inclined to transport ourselves to those inhospitable regions, may now rely upon being never out of our reckoning more than a few miles.

I think, finally, that there is every reason, on the part of Americans, for being more than satisfied with the just and kind manner in which your Society has treated the whole affair.

The PRESIDENT.—I ought lastly to mention, to the honour of our kinsmen on the other side of the Atlantic, that, not content with having done so much in the search after Franklin, they now, on the proposal of Dr. Hayes, the companion of Kane, contemplate a further expedition to ascertain whether

there is or is not an open sea beyond Smith Sound. As geographers we cannot too warmly thank them for the spirit they have displayed in this Arctic subject.

Before adjourning the meeting the President announced that, by the desire of the Council, he would again apply for the permission of the Senate of the University of London and of the Council of the Royal Society to hold the meetings during the next session at Burlington House.

ADDITIONAL NOTICES.

1. *Extract from Notes upon the Passage up the Peiho with Lord Macartney in 1793.* By Captain PARISH, R.A. With a Chart of the course of the river, printed on a reduced scale in Sir George Staunton's Account of the Embassy, and lately republished by the Hydrographical Department.

Communicated by Sir WOODBINE PARISH, K.C.H., F.R.G.S.

ABOUT the end of the month of July, 1793, H. M. S. *Lion* and the *Hindustan*, a large East Indiaman, attended by three small brigs, arrived with Lord Macartney and the British embassy off the Peiho River, in the Gulf of Pe-che-li. The depth of water not being thought sufficient to justify a nearer approach of the large ships with safety, they were anchored at a distance of 15 or 20 miles from the land, one of the brigs being sent in to communicate with the Chinese authorities, who were no sooner apprised of their arrival than they sent off supplies of all things needful for them, and junks without number to facilitate their landing and farther progress. It took some days to transfer all the heavy baggage and valuable presents for the Emperor, when, all being ready, the ambassador himself, with the gentlemen of his suite, went on board the brigs, and, accompanied by a swarm of Chinese junks, with a fair wind and tide, accomplished the entrance of the river without difficulty; and, after crossing a bar which lies off its mouth with only 7 or 8 feet water over it, ran up it some little distance, and were landed at a little town called Ta-coo, where the viceroy of the province was waiting to receive them with all honours.* At Ta-coo they went on board some passage-vessels prepared by the Chinese for their reception, described as being very conveniently fitted up for their accommodation—very high out of the water, and, although 70 or 80 feet long, of such light construction as not to draw more than 18 inches when all were on board. In these vessels it took them two long days to reach the city of Tiensing, a distance, according to Captain Parish's calculation by the course of the river, of about 85 miles from its mouth, although in a direct line not more than half as much.

Tiensing is situated at the confluence of the Peiho and Euhu, or Yung-leang-ho (the grain-bearing river), so named from its being the channel by which the greater part of the supplies for the consumption of the capital are brought from the southern provinces through the Grand Canal, and the many

* See Journal of the Royal Geographical Society, vol. iii. p. 304.—Ed.

rivers which, in connexion with it, form a continuous chain of inland navigation from the most southern parts of the empire. This city is, in fact, the emporium, and may be called the port, of Peking. The concourse of vessels was so great for two or three miles abreast the city, that it was with difficulty the junks with the embassy on board were able to pass through them. The population was said to be 700,000, all seemingly as busy as a hive of bees.

The course of the river as far as Tiensing runs nearly east and west, and is very winding, as will be seen on reference to the chart; above Tiensing it runs nearly north and south. Near *Yung-Swin*, about 30 miles above Tiensing, the river becomes more shallow, and the tidal action ceases, from which place the junks had to be towed against the stream for the rest of the way to Tong-chou, distant by the river from Tiensing about 95 miles, or from its entrance about 180—in a direct line perhaps not more than 90 or 100 at most. The operation of towing was performed by gangs of men of fifteen or twenty for each vessel, according to its size, who ran along cheerfully, singing as they went—stout, sturdy fellows collected for the occasion. The vessels passing up the river above Tiensing seemed innumerable—chiefly with cargoes of grain and salt for Peking.

They reached Tong-chou on the fourth day after leaving Tiensing, and shortly before arriving there, had a view of the mountain ranges of Tartary in the far distance, stretching across the horizon from east to west. So far the country on either side, as far as the eye could reach, had been one vast flat, for the most part low swampy grounds, cultivated in the vicinity of the towns and villages with rice and millet, and studded with willow-trees. The banks of the river appeared in several places to be considerably raised above the level of the adjacent lands, and great care was observable to strengthen them against breaches by any flooding of the waters. In some places sluices were noticed for letting them out for the purposes of irrigation.

Tong-chou is a very considerable city, surrounded on all sides, except that facing the river, by a high wall and ditch, the usual defences of Chinese cities. At this place, the river being no farther navigable, the embassy was landed in order to proceed to Peking, distant about 12 miles, a fine broad and paved road leading to the capital. It may here be observed, that although there was sufficient water in August to allow the large junks to proceed so far, upon the return of the embassy early in October the river was found to have fallen so much as to be barely passable for boats for some way below Tong-chou; and in the winter it was said to be frozen, and the navigation for a time suspended in consequence.

2. *Notes on the Zambesi, from Quillimane to Tete.* From the Portuguese, by J. LYONS M'LEOD, Her Majesty's Consul for Mozambique.

AFTER leaving Quillimane, on the left hand ascending the river, we arrive at Inhasuja, which is about 2 leagues from Quillimane. Here a stream runs to the sea. On the same side of the river we next come to Interro, about $3\frac{1}{2}$ leagues farther, where there is another stream running to the sea. From this place about 4 leagues is Maenboosha; about 4 leagues more, Mangara, where there is another stream running to the sea; 3 leagues farther is Chataunga; 4 leagues onwards Mejerumba; and 6 leagues farther is Mazaro, at the Boca do Rio. A long musket-shot from Mazaro, on the same side of the river, but looking down the Luavo, is Maruro.

The tide reaches Mangara, which is about 12 or 13 leagues from Quillimane. It takes three days going from Quillimane to Mangara by water, by land one day.

Boca do Rio is dry when the Zambesi is low, but there is always plenty of water in passing Mazaro to the sea by way of Luavo.

Above Boca do Rio, on the left hand ascending the river, immediately opposite Mazaro, is Chupanga, where the Zambesi is, both during the wet and also the dry season, at least 2 miles wide.

On the right hand going up (the left bank of the river) from Boca do Rio to the Rio Chire, the land is called Magangha. The Rio Chire in the rainy season has as large a volume of water as the Zambesi; and at the Boca do Chire the Zambesi rises very high in the rainy season, and this causes the water at Mazaro to flow down to Quillimane. Even in the dry season the Rio Chire is navigable, but the stream is not so rapid as in the Zambesi. The natives ascend it in large canoes, making voyages of from twelve to twenty days to trade with a people called Magangheros. This river flows past the western flank of the Maromballa mountains (that is to say, these mountains are to the east of it), which are very high. In ascending the Zambesi, this ridge is seen first from Mangara, and it is in sight until after passing Senna.

The land on the left hand, opposite Magangha, is called Bororo: it is mountainous.

Before coming to Boca do Chire one meets with many small islands which have no names, and some of which disappear during a very wet season; but close to the Boca do Chire, and just below it, are two considerable islands, the first of which is called Ilha Muinha; the second, which is larger, is called Ilha Mozambique, and has about 300 natives living on it. Ilha Muinha (in Kaffir) means "Salt Island;" and on this island, at Caia and at Sone (close to Senna), the salt used in the river is made. Along both banks of the Zambesi salt is made thus:—A portion of earth (taken up anywhere) is placed in an earthen vessel with a crack in the bottom of it; this is placed over another vessel, water is poured into the upper vessel, and the earth is moved about; the water that comes through the upper into the lower one is boiled or allowed to evaporate in the sun; the residuum is very fine salt, proving that the valley of the Zambesi was formerly the bed of the ocean.

The country in the interior opposite the mouth of the Rio Chire is called Chiringoma, from which to Sofalla is eight days' journey, and by land to Senna twelve days' journey.

After passing the Boca do Chire, and on the opposite side of the Zambesi, is Caia, where the best fish in the river abound: the fish are salted and dried in the sun; some quantity are also smoked, but the former are preferred in the native markets. From Caia to Senna is two days' walking (about 10 leagues), by water about $3\frac{1}{2}$ days (16 leagues).

After passing Caia you immediately come to Inhamudendundo, meaning, in the Maravi language, "large country." It runs along the river about 5 leagues, when one arrives at Inhamatuze, which, in the Senna language, means "dirty island," as in the rainy season it is entirely surrounded by water, and before it was brought under cultivation it was the resort of numerous animals who made their lairs there: it is one league from Senna.

Above the Boca do Chire, on the same side of the river, and nearly opposite to Inhamudendundo, is Santa Beze, in the rear of which, and all the way from the Boca do Chire, is a range of low, rocky mountains, dividing the streams of the Zambesi and Chire, the latter river running between this range and the Maromballa Mountains.

Between Senna and Tete there are numerous islands and banks, and even some rocks, and a few eddies; but when the river is in flood there is no difficulty in the way of steam navigation. In the dry season the navigation for a steamer would be doubtful. The banks of the river are well wooded with large timber. Fuel is easily procurable in great quantities.

The Zambesi, even in the dry season, is navigable from the Luavo mouth

to Cavaravassa for a vessel drawing four feet; and in the rainy season the river has at least in the shallowest part more than 12 feet, and during that season the water rises about *sixty* feet in the narrows of Lupata. As I have already stated, the tide reaches Mangara. The current is from 2 to 6 miles per hour, according to the season. The river is about 3000 yards wide at Tete; at Senna, $1\frac{1}{2}$ miles; at Quillimane, about 800 yards; at Quillimane Bar, more than 2 miles.

There are no fords. In some dry seasons there are rapids between Senna and Tete; they are not dangerous, and always passable. The bed of the river is mud, gravel, and sand.

In the dry season the water of the river is clear and transparent; in the rainy season it is brown, and at times approaching to a bright yellow. At this season the Mozambique Channel is discoloured at a distance of 80 or 100 miles from the Quillimane Bar. At Cavaravassa there is a high fall; here vessels discharge their cargoes, which are carried a quarter of a mile overland and reshipped; this operation is repeated twice before reaching Zumbo.

In the neighbourhood of Tete, gold, coal, and iron are found in close proximity. More definite information on this point, with a plan of that portion of the country, and particulars of labour, carriage, &c., I am promised by Major Sicard, Governor of Tete.

Large quantities of wheat are grown at Tete and in the surrounding country, which is considered the granary of the Zambesi: both Senna and Quillimane are annually supplied from thence. At Tete the price of wheat is about half a dollar per arroba of 32 lbs.

Opposite to Tete the country is almost overrun by the sugar-cane. The natives make sugar, but it is of an inferior quality, owing to their not understanding the manufacture of it.

The people of Tete have a great advantage over other parts of the river, for in the rear of the town, and at the foot of it, only a mile distant, is the Caruera, a high mountain, said to be from 3000 to 5000 feet in height. Here they have their plantations, consisting of different varieties of Indian or Kaffir corn, peas, beans, sweet potatoes, cabbages, onions, &c.; and close to the village is a place called Ilhalutanda, having an area of from 10 to 20 square miles, which in the rainy season is more or less flooded. When the waters retire, they plant rice, corn, wheat, beans, &c.; so that, should the plantations in the high lands fail for want of rain, they have a crop below; and, if the floods destroy the crop below, they have a supply in the mountains. In the rainy season there is generally a great fall of rain, accompanied by very high winds from the south and south-west. At times, when it is very hot, after continued calms, they have violent whirlwinds, which destroy everything in their course, breaking trees and taking up houses and whirling them in the air as if they were straw mats. Some years, in the months of June and July, they have a hot wind from the south-west, which burns up everything that may be in the ground; but this is unusual.

From Inhasuja (which is close to Quillimane) to Mazaro, and even in different parts of the river as high as Senna, the natives build their huts on stakes about 20 feet above the ground, so that in the rainy season they will not be endangered by the floods, which are constant and sudden. During this time it is not unusual for a native to indulge in the luxury of fishing out of his bed. In 1855 thousands of the natives were drowned by the river rising higher than usual; many who escaped the flood fell victims to the famine that succeeded it.

Fish of different species abound in the Zambesi. Buqueña; a long fish, long head, no scales, white, from 1 to 6 feet in length, weighing about 8 lbs., very oily, and without any small bones. Pende; from 6 to 20 inches in length, broad, scales, black, from 1 to 4 lbs. in weight; no small bones.

Muja; from 1 to 6 feet in length, from 1 to 10 lbs. in weight, long, scales, round head, sides silver, back black. Caçao; shark, called in the salt water Tubarão: similarly certain fish of this family ascend the Senegal, Amazon, and other great rivers, to the distance of several hundred miles from the ocean (vide Lyell's *Manual of Elementary Geology*, 5th edition, p. 126, and *Proceedings Geol. Soc.*, No. 43, p. 222). There are many other fish, and none poisonous.

The principal feeders or tributaries of the Zambesi are,—the Chire, between Mazaro and Senna; the Zangué, just below Senna (it is small); the Aruenha, between Massangane and Marangue; the Revubue, nearly opposite to Tete.

There are many lakes close to the river, and some of them communicate with it even in the dry season: among them may be named,—one at Caia; another in Maganja, near Santa Beze; another near Chiramba; and one in Benga, nearly opposite to Tete.

It is stated that there are no volcanoes, nor the appearance of extinct craters; and earthquakes are unheard of.

In the Caruera behind Tete there is one ferruginous spring.

For the foregoing information I am obliged to Major Tito Augusto d'Aranjo Sicard, Governor of Tete, and also to George Wilson, private in the Mozambique Company of Invalids.

3. *Explanations of the Physical Map of the Island of Madeira.* Dedicated to the Royal Geographical Society by J. M. ZIEGLER, Corres. Member.

THE impression made by the appearance of this interesting island on a traveller from the north, and especially an inhabitant of the Alps, is very striking, independently of the beautiful vegetation which covers the slopes of its mountains. There are seen deep chasms, precipices almost perpendicular, and rounded summits beside lofty needle-shaped peaks. In journeying through the island acclivities are passed which are ascended by hollows in their sides. Everywhere are encountered traces of volcanic action which, having become extinct, no longer present to the beholder columns of smoke or eruptions of cinders. But the interest of the admirer of the picturesque is not thoroughly satisfied—he sees only outlines more or less subdued. The crests and sharp peaks of the Alps are wanting, as well as the vastness of the masses composing our mountains, though the contrasts of great heights and great adjacent depths may be more remarkable. The rough-grained formation of the Vinoso (*pedra molle*, or *cantaria molle*, the building stone of the inhabitants, which they work marvellously), and the trachytic tufa resting upon it,* give not only to the rocks, but to the general appearance of the island itself, an aspect rather romantic and varied than wild and grand. Nevertheless there is probably no spot on the earth which exhibits more clearly the differences between the north and south declivities of mountains and the influence of elevation as affecting vegetation and temperature, and which would be more adapted for facilitating meteorological observations, and merits multiplied stations for such researches, and botanic gardens.

The map to which these explanations refer, in displaying the plan of the

* The most ample details will be found in the following works:—O. Heer, *Die fossilen Pflanzen de S. Jorge* (1856); by the same Author, *Naturcharacter und geologisches Alter von Madeira* (1852); Capt. Vidal, R.N., *On the Geography of Madeira*; and lastly, an important work to be published by Sir Charles Lyell and G. Hartung on the Geology of Madeira.

island, ought at the same time to indicate the geographical distribution of its most abundant and characteristic plants. Along the shore the culture of the vine is general, and to the greater extent in the southern part of the island. It prevails especially in the gorges of the narrow valleys, as, for example, adjacent to Camara de Lobos, in the Caldeira, and Estreito; and near Funchal, in the valley of Santa Lucia, on the declivity of St. Roque. Under the branches of the vines, which are trained over trellis-work of reeds, legumes are raised in great quantities, and even the sugar-cane, followed closely by the coffee-plant and the yam (*Arum peregrinum*; *Arum colocasia*), which requires humidity for its growth, as well as heat. Rye and wheat are cultivated above the chesnut woods to a height of even 2500 feet on the north coast, where the inhabitants have farmed in the *Mato* region extensive lands for some years past. The vine succeeds perfectly on the southern coast in positions open to south and east winds, even at an elevation of nearly 1500 feet. On the northern side of the island it thrives in the valleys, and especially in places sheltered from the west wind, interlacing its branches with those of the chesnut-trees. In the eastern part of the island the vine is cultivated to a considerable extent, but on the western side vineyards are exceptionally met with only in two localities, near Porto do Pargo and Porto Moniz. It must be remarked that these two places have suffered least from the grape-disease, which for four years has caused much calamity to all the inhabitants of Madeira. Above the vine, the chesnut forests (*Castanea vesca*) extend on the southern declivities, between the altitudes of 1000 and 2000 feet above the sea: at Jardin da Serra and Curral they reach 2500 feet of elevation. On the north coast the chesnut constantly follows the vine; it avoids there the wind which it easily supports on the south side of the island. The laurel everywhere avoids strong currents of air. The fine and often very large trees of this order comprise the following species: *Laurus-canariensis*; the til of the Portuguese, *Oreodaphne fetens*; and the *Persea Indica*, or vinhatico of the natives. It is only in the north of the island that virgin forests of these trees are found; in the south they are concealed in narrow crevices, and are scarcely ever met with in considerable clusters, except at Curral in the Serra d' Agoa, and on the Serra di Fora. The pine (*Pinus pinaster*) is of a different nature. It seeks localities exposed to currents of air; it is not found in the ravines; and it does not thrive in the northern parts of the island, where sea-breezes are not effectually experienced. It conforms in its character with our pines in preferring sandy situations and a dry soil. Above the region of the laurel extends that of the *Mato*, especially on the northern declivities, covered everywhere with shrubs equal in height to trees, and in some places collected in impenetrable thickets. The plants contained in this region are the *Erica arborea*, *Vaccinium Maderense*, *genista*, and *ulex*. There is but one place at which this region is interspersed with a group of laurels. The Chão do Caramujo (plain of snails), elevated above the south extremity of the valley of St. Vincent, is surrounded by a thick bush of *genista* and *erica*. The plants of this region, the lower ones being represented chiefly by the uveira of the natives (*Vaccinium*), in common with the laurels, do not well bear the westerly winds. They grow indeed on the upper slopes under the influence of these winds; but they diminish in height, and are farther separated from each other in proportion as they are exposed to the inclemency of the atmosphere. This is readily seen at Paul da Serra and at Poizo, a short distance below that crest (col), toward the north. On arriving at Feiteiras the luxuriance of the *genistas* and *ericas* is suddenly manifested, and it increases until we arrive in the laurel forest of Rio Frio. The same thing is met with on the banks of the São Vicente, at Calheta. Having left the groups of chesnut-trees, we cross some rye-fields, and arrive at the *Mato*, which is introduced by the beautiful airelle (*Vaccinium*), surpassing in height a horse and

his rider, immediately followed by the broom (*Genista*) and heath (*Erica*). These shrubs, however, become more rare and stunted on the plateau of Paul da Serra. On the descent towards Calheta they further diminish, the heath becoming the representative plant of that region. As to locality and soil, these three species of plants correspond remarkably in their preferences, or otherwise, with those of our latitudes. The smallest, the airelle (*Racinium myrtillus*), seeks the humid shade of the pine forests (*Pinus picea*); the heaths delight in the vicinity of the firs (*Pinus sylvestris*); whilst the brooms (*Genista tinctoria* and *pilosa*) prefer situations open to the sun.*

In order to complete the physiognomy of the island, which the map is intended to reveal, some meteorological indications must be noticed, resulting from its configuration. There are but two stations, with observations at which we are acquainted: those made at Funchal and in its vicinity we learn from the English works of Mason, Clark, White, and Harcourt; a German work lately published † informs us of the results of those made at St. Anne. The hygrometric observations confirm what has been stated concerning the vegetation on the different slopes—that those on the north are more humid than those on the southern side. Hence it is that the levadas or conduits of water are necessary to render irrigation and extended cultivation practicable on the southern side of the island. The dominant winds, the north and north-west, ‡ bring damp. Their predominance, however, does not enfeeble the influence of the west winds on the vegetation. The valleys of São Vicente and Boa Ventura are completely open to currents of air from the north, notwithstanding their declivities exposed to the west wind are clothed with a more stunted vegetation, especially in their upper portions, than are the opposite slopes. In the same account, the most extensive laurel woods, and containing the largest trees, are seen in the valley of Medada, which is closed on the west side. The cultivated lands at greater elevations are liable to the same conditions.§ Even in the Bay of Funchal, where west and north winds are very rarely experienced, the banana (*Musa paradisiaca*) is seen in perfection only where it is completely sheltered from them. The same is the case as respects the few date-trees (*Phoenix dactylifera*) on the south and east coasts. The localities suitable to their growth are protected against the west wind; examples in proof of this are seen at Calheta, Ponta do Sol, Camara de Lobos, Funchal, and Machico, which places, however, are subject to sea-breezes. The pine (*Pinus pinaster*) bears every current of air; and there is every probability that the upper boundary of its forests marks the limits of its sea-breezes in the interior of the island.

The abrupt rise of the coast in some places from the border of the sea causes

* Observations on plants which have been introduced, and on the flora of Madeira, will be found in the work of O. Heer, 'Die periodischen Erscheinungen der Pflanzenwelt in Madeira' (1853).

† Dr. C. Mittermaier, Madeira und seine Bedeutung als Heilungsort (1855).

‡ According to Mittermaier, in 1000 observations—

The N. wind was found to prevail 256 times—the W. 77 times.			
N.N.W.	68	N.W.	170
N.W.	88	N.N.W.	166
S.	8	W.	4

§ A position analogous to that of Madeira is occupied by the rock of Tristan d'Acunha. According to the communications of Captain Denham, R.N. (Nautical Magazine, 1853, pp. 183, 188), we may conclude that notwithstanding the variable climate there, the s. and s.w. winds bring humidity, as is the case at Madeira with n. and n.w. winds. The conditions of the s. and n. coasts are reversed in the two islands. It would be interesting to know how far the contrast holds good with respect to the vegetation of Tristan d'Acunha.

an ascending current which in those parts rises nearer to the coast-line than to the massive and terraced heights of the centre; the breezes are thus hindered from penetrating into the interior, and it doubtless thence happens that the pine-woods approach the sea more nearly in the south-east part of the island, whilst in the south-west they are withdrawn into more central positions. On the two sides of Fajã d'Ovelha, which rise almost perpendicularly from the sea-shore, the groups of pines are favoured by winds coming in a direction given to them by the ascending currents from the neighbouring ribeiras; whilst above Prazeres and Arco da Calheta these trees are mostly limited to the crests of the heights, the smooth slopes of which cause the ascending current to be driven farther into the interior. The south coast is especially suitable for observations on the regular changes of the land and sea-breezes. The northern coast affords less facilities for them on account of its humidity and dense vegetation. Thermometric observations made in the neighbourhood of Funchal (at Caminho de Torrinha, 284 feet above the sea) have proved that the temperature of the air is generally at its maximum towards noon; the latter may, however, be attained before that time, on days when the morning has been cloudy. If in the forenoon the sun dispels the clouds, the maximum is reached more than an hour before noon, since the sea-breeze adds to its intensity.

The impression made by the first sight of Madeira on an inhabitant of the Alps has been mentioned. Some comparisons may therefore be made between the slopes of the valleys in the two regions. The sources (of the rivers) in Madeira cannot be regarded in the same point of view as those in the Alps, where the water gushes from the rocks, or issues from beneath glaciers. In those mountains are seen furrows of rapid descent which conduct the condensed moisture into a common bed. Nevertheless the ribeiras of Madeira, to a certain extent, bear a similarity to the upper courses of the rivers of the Alps. On account of the considerable elevation of the central mass of the island (the mean height of Madeira being, however, not more than about 2660 English feet above the sea), the loftiest summits are found almost immediately overlooking the deepest valleys, which, seen from commanding eminences, appear to have their floors almost horizontal. This is why it is sometimes heard said at Funchal, that "the Ribeira dos Soccorides flows *upwards* from Curral to the sea, as is proved by the view of it from the summit of the Pico dos Bodes!" However, even an experienced eye may be deceived as to the actual proportions of descent of the ribeiras. The following table gives the absolute and relative fall of the four principal rivers of the island, taking as the commencing point of each the place of junction of mere brooks, the heights of which are indicated in the Map:—

The R. dos Soccorides has an actual descent of 2086 ft., or 348 ft. per Eng. m.

"	Brava	"	2170	"	460	"
"	Janella	"	3200	"	533	"
"	do Porco	"	1200	"	600	"

These are descents which are never met with in the Alps, unless exceptionally.

The figures set down above, and the directions of the ribeiras, prove that the waters have found no great resistance to their flow from the volcanic formations, and that they pursue very nearly the shortest courses. If it be asked why it is not so in the Alps, it will be worth while to consider the nature of the declivities which make the greatest resistance, such as the rocks of the Alps oppose to the flow of the waters. The formations which oblige rivers to make the greatest windings are those of chalk (*Terrain créacé*), and the *upper beds of the Jura formation*. Examples in proof of this are seen—

in Europe, in the Jura, as afforded by the river Doubs; in France, by the Saône and Loire; in the Alps of Trent and Belluno, by the Adige, Piave, and Tagliamento; in the Julian Alps, by the Isonzo, Sau, and Kulpa; in Dalmatia, by the Unna, Verbitza, and Narenta; in the Apennines, by the Tiber, Velino, and Pescara; in the north of Bohemia, by the Elbe; in North America, by the Missouri and Rio Grande; in India, in the Salt Range, by the Indus; east of the Aravalli mountains (Rajpootana), by the Bairass and Chumbul; in the Nizam's dominion, by the Wurda and Godavery, &c. A band, or circumvallation of the (calcareous) formations denoted, extends on the north and west of the Alps from Wiener-Neustadt to Nice. The primary direction of the principal rivers of the southern and central Alps is remarkable in so far as the upper courses of the Enns, Salza, Inn, Rhine, Reuss, and Aar, extend nearly parallel to the southern crest of this circumvallation—that is, from south-west to north-east. All these rivers suffer an inflection towards the north, in entering this bend, to pursue a new deviation on emerging from it, so that the water-courses of the Southern Alps have a north-east, and those of the Central Alps a north-west, direction. The analogy is borne out in the western part of the Alpine region by the rivers Arve, Rhone, Isère, and Durance. The mean fall of the chief Alpine rivers may be taken as follows:—

In the Southern Alps.

Upper course of the Enns,	14 ft. per Eng. m.—	across the calcareous band,	27 ft.
„ Salza,	32 „	„	33 ft.
„ Inn,	42 „	„	11 ft.

In the Central Alps.

„ Rhine,	108 „	„	15 ft.
„ Reuss,	280 „	„	0.5 ft.
„ Aar,	324 „	„	8 ft.

These figures show that the more rapidly inclined is the upper bed of a river the less is its descent when crossing cretaceous and the upper Jura formations. These rocks then offer a great resistance to the passage of water—a phenomenon not met with in Madeira.

In offering to the Royal Geographical Society of London the Physical Map of the Island of Madeira, with these Explanations, I must add the following remarks.

In drawing up the Map, I enlarged upon the scale of the marine chart of Capt. Vidal, R.N. (1843); and for the elevations I consulted what that officer has published on the Geography of Madeira, as well as the results of the observations of Sir Charles Lyell and Mr. G. Hartung. I owe many obligations to the constant kindness of Mr. Hartung, who has readily communicated to me from his well-stored portfolios that with which a residence of six winters in Madeira made him acquainted. I should not have ventured to publish the Map without the assistance of a friend like himself, who knows the island perhaps better than any other geographer. At the same time that I acknowledge the thanks due to Mr. Hartung, who has favoured me with his advice also during the engraving of the Map, I must also record those to another friend, who knew Madeira from repeated visits—I mean Dr. F. Mittermaier, the brother of the author of 'Madeira als Heilungsort.'

As to my own remarks, they have been nearly limited to considering the characteristic formation of the island, and the distribution of the plants most distinctive of its vegetation. During my travels I made some thermometrical observations, which, however, merit little consideration, since they did not

extend over the period of a few weeks. The following were noted in March, 1854:—

On March 10th, at

Santa Anna,	1000 ft. above the sea,	time 7½ A.M.,	cloudy.	Temp. 52° F.
Pico Ruivo,	6059	noon	„	46°·5
Santa Anna,	1000	8 P.M.	„	54°·5

On March 12th, at

São Vicente,	800	7 A.M.	quite clear.	„ 52°
Paul da Serra,	5200	10 A.M.	fog. W. wind.	„ 41°
Calheta,	1200	4 & 6 P.M.	cloudy.	„ 60°

On the 21st, 22nd, and 23rd of the same month snow lay on the summits above the height of 3500 English feet.

The calamity caused by the grape disease may be conceived, knowing that in good years the produce of Madeira amounts to from 20,000 to 30,000 pipes of wine, and that the mean annual quantity of wine obtained in 1852 and 1853 was no more than 200 pipes in the whole island.

J. M. ZIEGLER.

Winterthur, Switzerland.

4. *Essay on Chile.* By Don V. PEREZ ROSALES.

THIS book is written as an inducement to emigrants to settle in the western part of Chile, to which part only reference is made. The book is divided into two parts. The first part embraces the geographical position of Chile, its climate, hydrography, and productions.

The second part considers Chile in its political bearings, and then, in several chapters, gives an account of the different provinces of Chile, taken separately, concluding with a chapter containing a few general observations.

5. *Notes to accompany the Plan of Queenstown, South Africa, sent to the Royal Geographical Society.* By Captain W. T. BAKER, F.R.G.S.

QUEENSTOWN lies in 31° 59' s. lat., 27° long. E., at the southern base of the Bonkolo Range, and 95 miles N. of Grahamstown; the river Kowana, a tributary of the Great Lei, winds in a tortuous rocky bed immediately in front, whilst a vast basin of grass-land, varying from 3 to 10 miles in breadth, stretches away to the south. Behind, the mountains tower to the height of from 500 to 1500 feet above the vale; the great Hanglip, rearing its bluff crest at 6800 feet above the level of the sea, is a very conspicuous feature in the landscape about 8 miles due north of the place. The proximity of these mountain ranges subjects Queenstown occasionally to very rapid changes of temperature; in winter, *i.e.* in June and July, the tops are often covered with snow, which, however, rarely falls in the valley; the nights are sharp and piercingly cold, while the midday sun is as warm and genial as in the hottest day of an English summer. September and October bring frequent hurricanes from the north-west, which sweep down upon the plain with great violence, and have more than once levelled our tents to the ground. Yet, notwithstanding these sudden changes, the climate is remarkably healthy,—a

circumstance to be attributed in a great measure to the clearness of the atmosphere as much as to the general dryness of its surface-soil.

The soil, for the most part a rich alluvial loam, is capable when properly irrigated of producing every variety of European vegetable, but neither garden nor agricultural pursuits are much indulged in by the colonial farmers, wool being the greatest and most profitable staple, and the boundless extent of good pasture land, with numerous saline plants, shows how peculiarly adapted the country is for sheep-breeding. The bases of the mountains are sprinkled with the prickly mimosa and evergreen shrubs, whilst the higher ridges and rugged tops are embellished with various species of succulent plants and flowering aloes, but there are no trees. Owing to the rapid decomposition of the sandstone formation, some of the undercliffs have assumed the most grotesque and singular outlines—embattled, as it were, with natural ramparts of perpendicular rocks, whilst they are garrisoned in many places with troops of large baboons.

The town itself, though barely three years in existence, is fast rising into a place of importance, being on the main line of traffic from Buffalo Mouth to Aliwal (North) and the Free State: there are 13 or 14 stores, and the business done is very great. The water of the Kowana has been carried out by means of an aqueduct from about three miles above the town, and from it smaller streams branch off to different parts; but very little in the ornamental way has been attempted, except planting a weeping willow here and there in the streets and along the watercourse. The camp is on an elevated plateau on the north side, and till within the last two months has been occupied by the headquarters of our regiment, eight companies strong; but now it is sadly diminished, 300 men being detached at Bramneck, Tylden, and Winfogleneck along the frontier line, and the headquarters, too, have moved to Grahams-town, leaving only half a company at Queenstown, so that the large camp exists *now* only upon paper, though there are some chances of its being again augmented. Sportsmen find plenty of work in the plains around: the herds of beautiful springbuck afford the most exciting chase, and for birds there are partridge (grey and red-winged), guinea-fowl, the Kaffir pheasant, quail, plover, and snipe in abundance; excepting a few hartebeests and ostriches, which are very wild on the Boutebuck Flats, the larger game has all been driven far inland by the advancing steps of the white man.

6. *The Discovery of America by the Northmen.**

THE Dane Gardar, of Swedish origin, was the first Northman who discovered Iceland, in 863. Only a few out-places of this country had been visited previously, about 70 years before, by Irish hermits. Eleven years subsequently, or in 874, the Norwegian Ingolf began the colonization of the country, which was completed during a space of 60 years. The colonists, many of whom belonged to the most illustrious and most civilised families in the North, established in Iceland a flourishing republic. Here, on this distant isle-rock, the Old-Danish or Old-Northern language was preserved unchanged for centuries, and here in the Eddas were treasured those Folk-songs and Folk-myths, and in the Sagas those historical tales and legends, which the first settlers had

* Communicated by Professor Charles C. Rafn, and founded on his work 'Antiquitates Americane sive Scriptores Septentrionales rerum Ante-Columbianarum in America,' published by the Royal Society of Northern Antiquaries of Copenhagen.

brought with them from their Scandinavian mother-lands. Iceland was therefore the cradle of an historical literature of immense value.

The situation of the island and the relationship of the colony to foreign countries in its earlier period, compelled its inhabitants to exercise and develop their hereditary maritime skill and thirst for new discoveries across the great ocean. As early as the year 877 Gunnbiorn saw for the first time the mountainous coast of Greenland. But this land was first visited by Erik the Red, in 983, who three years afterwards, in 986, by means of Icelandic emigrants, established the first colony on its south-western shore, where afterwards, in 1124, the bishop's see of Gardar was founded, which subsisted for upwards of 300 years. The head firths, or bays, were named after the chiefs of the expedition. Erik the Red settled in Eriks-firth, Einar, Rafn, and Ketil in the firths called after them, and Heriulf on Heriulfsnes. On a voyage from Iceland to Greenland this same year (986), Biarne, the son of the latter, was driven far out to sea towards the south-west, and for the first time beheld the coasts of the American lands, afterwards visited and named by his countrymen. In order to examine these countries more narrowly, Leif the Fortunate, son of Erik the Red, undertook a voyage of discovery thither in the year 1000. He landed on the shores described by Biarne, detailed the character of these lands more exactly, and gave them names according to their appearance: Helluland (Newfoundland) was so called from its flat stones, Markland (Nova Scotia) from its woods, and Vineland (New England) from its vines. Here he remained for some time, and constructed large houses, called after him Leifsbudir (Leif's Booths). A German named Tyrker, who accompanied Leif on this voyage, was the man who found the wild vines, which he recognised from having seen them in his own land, and Leif gave the country its name from this circumstance. Two years afterwards Leif's brother, Thorwald, repaired thither, and in 1003 caused an expedition to be undertaken to the south, along the shore, but he was killed in the summer of 1004 on a voyage northwards, in a skirmish with the natives.

The most distinguished, however, of all the first American discoverers is Thorfinn Karlsefne, an Icclander, whose genealogy is carried back in the Old-Northern annals to Danish, Swedish, Norwegian, Scottish, and Irish ancestors, some of them of royal blood. In 1006 this chief, on a merchant-voyage, visited Greenland and there married Gudrid, the widow of Thorstein (son of Erik the Red), who had died the year before in an unsuccessful expedition to Vineland. Accompanied by his wife, who encouraged him to this voyage, and by a crew of 160 men on board three vessels, he repaired in the spring of 1007 to Vineland, where he remained for three years, and had many communications with the aborigines. Here his wife Gudrid bore him a son, Snorre, who became the founder of an illustrious family in Iceland, which gave that island several of its first bishops. His daughter's son was the celebrated Bishop Thorlak Runolfson, who published the first Christian code of Iceland. In 1121 Bishop Erik sailed to Vineland from Greenland, doubtless for the purpose of strengthening his countrymen in the Christian faith.

The notices given by the old Icelandic voyage-chroniclers respecting the climate, the soil, and the productions of this new country are very characteristic. Nay, we have even a statement of this kind as old as the eleventh century from a writer, not a Northman, Adam of Bremen. He states, on the authority of Svein Estridson, the King of Denmark, a nephew of Canute the Great, that the country got its name from the vine growing wild there. It is a remarkable coincidence in this respect that its English re-discoverers, for the same reason, name the large island which is close off the coast Martha's Vineyard. Spontaneously growing, wheat (maize or Indian corn) was also found in this country.

The total result of the nautical, geographical, and astronomical evidences in

the original documents, place the situation of the countries discovered beyond all doubt. The number of days' sail between the several newly found lands, the striking description of the coasts, especially the white sandbanks of Nova Scotia and the long beaches and downs of a peculiar appearance on Cape Cod (the Kialarnes and Furdustrandir of the Northmen) are not to be mistaken. In addition hereto we have the astronomical remark that the shortest day in Vineland was 9 hours long, which fixes the latitude of $41^{\circ} 24' 10''$, or just that of the promontories which limit the entrances to Mount Hope Bay, where Leif's booths were built, and in the district around which the old Northmen had their head establishment, which was named by them Hóp.

The Northmen were also acquainted with American land still farther to the south, called by them Hvítamannaland (the land of the White Men) or Irland it Mikla (Great Ireland). The exact situation of this country is not stated; it was probably North and South Carolina, Georgia, and Florida. In 1266 some priests at Gardar in Greenland set on foot a voyage of discovery to the Arctic regions of America. An astronomical observation proves that this took place through Lancaster Sound and Barrow Strait to the latitude of Wellington Channel. The last memorandum supplied by the old Icelandic records is a voyage from Greenland to Markland in 1347.

7. *Ascent of the Congo*—1857. By Commander J. HUNT.*

I DETERMINED on obtaining some information of that part of the river hitherto unexplored, as we found, from Punta de Luisa upwards, the chart was no guide to us whatever. About 2 P.M. on the 1st instant I proceeded up the river, keeping the left bank. We found the river, instead of being straight, as shown in the chart, is a succession of serpentine turns, each point of the turn causing a small rapid, at some of which there was apparently a fall of from 1 to 3 feet. We had great difficulty in shooting the boats through these rushes; on one or two occasions were obliged to use hauling lines to assist us. On these occasions I was kindly assisted by Commander Moeresby, of the *Sappho*, who accompanied us. On the nights we anchored. We always found convenient anchorage in little bays formed by rocks, and overhung by trees of a hardy evergreen species, differing from those at the mouths of African rivers. On the 4th instant, at 8 A.M., we reached the commencement of the falls, having had extreme difficulty in getting over the last rapids about 2 or 3 miles below them. From what we could observe, the Falls of Gallala below the great fall, which we believed could be but a very short distance from the place we reached, are a succession of small falls. The river here we found, by experiment with a rifle, was about 200 yards wide, barriered on each side by steep rocks and boulders of rocks, rising almost perpendicularly in some places from 600 to 800 feet. The fall we reached was something between a fall and a rapid, the descent being from about 8 to 10 feet, the water shooting out from the angle of the rocks on each side of the river, forming the letter V, the lower part being down the river, the reaction at the sides making a terrific surf, which made it impossible to see whether there were rocks in the middle or not. Owing to these difficulties in the river, and the rocky nature of the land around that part of it, and provisions being short, at 11 A.M. we commenced our return, and reached Embourina on the same evening, the current running with us from 6 to 9 miles an hour. I returned

* Extract from a letter addressed to Commander V. G. Hickley, of the *Childers*, by Commander J. Hunt, of the *Alecto*, dated 15th January, 1857.

to my ship at Shark Point on the 6th instant, not having had a single case of sickness during the whole expedition.

With this Report I enclose some rough outlines of the principal points and headlands of the river. I consider the distance from Punta de Lucha to Embourina, following the turns of the north side of the river, to be about 60 miles, and from Embourina to the first commencement of the falls about 70 miles. I consider that above Embourina the navigation would be dangerous for sailing vessels, but of easy access to small steamers, such as our gun-boats; and I believe that the river could be ascended above the falls by canoes, occasionally carrying them across the points where the rapids are strong.

The scenery and appearance of cultivated ground in some parts of the soil is of a bright red and dark brown colour, and near the river dark green rocks of a very heavy substance, which I fancy contains both iron and copper. The ravines between the hills are well wooded, and are marked with watercourses which by their appearance must have had at times large bodies of water washing down them. We observed species of the arbutus, and many other trees now common in English gardens. The rocks and cliffs near the water were festooned in many places with magnificent flowering creepers, among which I noticed the Passion flower, and yellow, white, and pink jasmines. Several different sorts of deer and monkeys were seen, also a species of gnu in the river. I saw at various times hippopotami and large alligators, and a species of otter, also a great variety of wild fowl.

The weather was so pleasantly cool, that on one or two occasions we dispensed with awnings in the daytime. We saw but few natives about Embourina, and they appeared a poor, harmless set, chiefly employed in fishing.

8. *Coast of Morocco.* By W. J. ELTON, Vice-Consul at Mogador.

Communicated by Captain J. WASHINGTON, R.N., &c.

At about an hour and a half's journey south of Agadeer is the mouth of the river Soos. This river rises at a place called El Kabla, about three days' journey eastward of the sea. At rather less than half a day's journey south of the mouth of the Soos is the mouth of the river Massa, which rises in a mountain about a day's journey in the interior from Agadeer. At the mouth of the Soos, and at that of the Massa, there is at high water about 12 feet, and at low water about 2 feet of water. At the mouth of the Soos there is no surf, but at the mouth of the Massa there is much. From the mouth of the Massa to a little town called Seed Bom Noire, where there is a small harbour, is about half a day's journey; from Bom Noire to a town called Bulfidial it is three hours' journey—the town cannot be seen from the sea; from Bulfidial to a place called Grishime about three hours' journey. At Grishime there is a village which can be seen from the sea. From Grishime to Meryleft it is also about three hours' journey. At Meryleft there is a saint house, which can be seen from the sea; there are also the ruins of a battery. At about half an hour's journey south of Meryleft are a town and gardens. Meryleft is said to have been a port about 200 years ago. There is an island near the coast which at low water can be reached by wading. Some of the inhabitants of Meryleft have arms, which it is said were imported there from a place called Erykoont, which is about three days' journey from Meryleft. From Erykoont to Legyera (where there is no town) it is two hours' journey. At Ifney there is a saint-house, and more than 100 houses, all of which can be seen from the sea. At all the places named, and the coast between

them, except at Bom Noire (where there is a beach), the coast is rocky, and there is generally a heavy surf breaking. At all the places named from Bom Noire to Ifney there are many boats. About twenty-five years ago a vessel, supposed to be Spanish, was with great difficulty loaded at Bom Noire with wheat and beeswax. The vessel lay off Bom Noire several days before she was communicated with : at last a boat went to her, when one of the crew of the vessel went on shore and made presents to the chief, Ali Oh Hassan, of guns, swords, &c. After that, boats went off to her with cargo, but the master would not allow more than one boat at a time alongside, the cargo of which he paid for. The Moors are said to have had the intention of taking possession of the vessel ; but a Moor in one of the boats which went off with cargo informed the master of the vessel of what the Moors intended, and he immediately got his vessel under weigh, although the cargo had not been completed. From Ifney to the mouth of the river Assaka it is about half a day's journey. At the mouth of the Assaka there is plenty of water, and the rise and fall are very little. About a day's journey eastward of the river Assaka is the town of Wadnoon, which is the commencement of the Sahara, or Desert. From the mouth of the river Assaka to the mouth of the river Drah, which rises at a place called Ohivarran, an hour and a half's journey in the interior above Wadnoon, it is a day and a half's journey. The Drah at its mouth, and for an hour and a half's journey up, cannot be forded at high water ; at low water there is not more than two feet of water : generally there is not much surf at the mouth. A short time ago the chief at Wadnoon, Sheik Beiruk, intended to have established a port at a place called El Bouida, in the province of Ezergien. El Bouida is a bay about three hours' journey north of the mouth of the Drah. At El Bouida there are houses, which can be seen from the sea. The population in the district, said to be under Sheik Beiruk's rule, is very large ; but of this population there are only about 8000 armed men, who are actually under his control : of these 8000 about 2000 are horsemen. The property of the people at Wadnoon consists chiefly of horses and sheep, each inhabitant possessing about 20 camels and 100 sheep ; the wealthier inhabitants as many as 300 camels and 2000 sheep each. Sheik Beiruk is said to be very wealthy, and trades much.

9. *Memoranda of a Visit to the Site of the Ruins of the ancient City of Sizicus in Asiatic Turkey.* By E. LEAHY, C.E. 1857.

Communicated by SIR RODERICK I. MURCHISON.

LEFT Constantinople for Panorma, in my steamship *Star* on Saturday morning, 23rd May, at 9 o'clock A.M. Panorma is about 70 miles s.w. by w. from the Seraglio Point, and is situated on the Asiatic shore of the Sea of Marmora. Population about 4000, one half being Christian and the other half Mahometan. The place is remarkable chiefly for its proximity to the site of the ancient city of Sizicus, and for some quarries of handsome red marble found in an insulated deposit of limestone at the southern suburbs of the town.

I was accompanied by Dr. and Mrs. Sarell, Mr. Philip Sarell, of the British Embassy, and the Greek Archbishop or "*Despot*" of Sizicus, and after a pleasant run of about nine hours we anchored opposite the town of Panorma at 6 o'clock P.M.

Next day the whole population of the town turned out to welcome the "*Despot*" (the general name in the East for bishop), who had not seen his

flock for the last three years, being too much occupied with "important business" in Constantinople.

The Archbishop's influence procured us the best horses and saddles in the town, and, accompanied by him, we all started at 10 o'clock A.M. for the ruins of Sizicus, where we arrived in about an hour, the distance being only 5 miles. These ruins are situated on the N.E. end of the isthmus separating the peninsula of Artaki from the mainland.

Comparatively few traces of Sizicus now exist above ground; even the name would in all probability have long since been unknown in the country but for the creation of an archbishopric of the same name.

The most remarkable ruins are an aqueduct and some sarcophagi; the latter are, indeed, in such good preservation that they cannot well be called ruins. Close on the sea-shore are two of these tombs; they were lately uncovered, being only 3 to 4 feet below the surface, and are in fine preservation. The covering-lid of each sarcophagus is hewn out of one block of white marble, of which there are extensive beds in the adjacent island of Marmora, and each of those blocks must have weighed upwards of 20 tons. The interior of each sarcophagus was divided into two stories by a thick flagged floor, inserted in and supported by the side-walls. In the lower story were found eight, and in the upper seven, human skeletons. In the general outline the figure of the Egyptian sarcophagus in the British Museum is alike to those of Sizicus. The recesses of the architraves of the latter do not appear to have been quite finished, but the workmanship of the mouldings is excellent. One sarcophagus is ornamented with an "egg and dart" moulding, running quite around in full relief, and wrought as finely as anything of the sort, ancient or modern, within my knowledge.

The whole breadth of the Isthmus of Sizicus is covered with broken columns and massive walls faced with square blocks of black granite, and backed with rubble masonry set in lime cement. The walls are distinctly traceable across the isthmus, from sea to sea, at the junction of the peninsula of Artaki; and appear to have served as the line of fortifications for Sizicus facing the continent. The city extended from those walls into the peninsula of Artaki, and at a distance of about a mile there still remain the ruins of a large aqueduct, in many parts over 100 feet high.

Strabo represented the peninsula as an island, and there is a tradition amongst the present inhabitants that the sea formerly ran across the isthmus, and that ships passed and repassed; but, if ever such a communication existed, there is no trace of it to be found at present.

The chart of this coast (Sea of Marmora), published and compiled in 1830-31 by our Admiralty, from surveys purporting to have been made by French, Spanish, and English, is not as accurate as could be wished. This chart shows a considerable inlet or canal cutting the isthmus almost across, whilst in fact there is no inlet whatever. The isthmus maintains a regular breadth of about a mile, without any indent or projection from sea or land. There is a sort of marsh in the middle which becomes a lake in wet weather.

Another and more serious error of the chart is the rock which is represented *above water* 1 mile S.E. of Mola island, at the entrance of the Bay of Panorma, and in the direct course from Constantinople to Panorma. There is no rock *visible* in that situation; but exactly in the same position there is a rock *having four feet water over it*, and is consequently very dangerous. Many vessels have been lost upon it, owing possibly to an over-confidence in the chart, and a consequent belief that *no dangerous rock existed under water*.

The Admiralty charts, prepared from the surveys of British officers, receive universal confidence for accuracy, and, in truth, they defy all criticism both for accuracy and clearness. An error of the sort just alluded to is the more dangerous because of this confidence, as foreigners unable to read English

rely upon the Admiralty's well-known stamp, and discover perhaps when too late that the surveys were duly noticed in the title of the chart as not being made by the Admiralty officers. This chart of the Sea of Marmora ought to be corrected and republished.

It is possible that the rock alluded to, which is now under water, might have sunk since the time the surveys were made, and it is also possible that the same cause which depressed the rock might have elevated the isthmus of Artaki. This supposition would be partly consistent with the representations both of the chart and of Strabo, but still not quite reconcilable with the comparatively recent date of the Admiralty chart.

At the same time, it may be well to remark that the earthquake of March, 1854, with which we in these localities were visited, caused many changes in the country between Artaki and Mount Olympus, so much so that the courses of some rivers near Brusa were entirely altered, and have remained so since.

EDMUND LEAHY.

10. *Ascent of the Albert River in search of the Letters of Mr. A. Gregory, in command of the North Australian Expedition.* By Mr. JAMES FLOOD, Assistant Botanist.

November 13th, anchorage off the mouth of the Albert.—Daylight, heavy clouds to the s.w., wind strong from the E.; the bar in front of the river could be seen from the masthead, and was dry for a long distance. Deeming it unsafe to start with a small boat deeply laden while the wind was blowing so fresh and such a heavy cross sea on the bar, caused by the tide and wind, I had everything required for the journey got in readiness, with 10 days' rations, consisting of flour, pork, tea, and sugar, with a small keg of water. The wind and sea having somewhat abated, I left the vessel at 11.5 A.M., taking with me three men of the expedition, viz. Selby, Showell, M'Donald, and one of the crew. In crossing the bar the boat grounded, when we had to get out and draw her over the sand for about a mile. Entered the river (Kangaroo Point) at 12.45 P.M., when, passing the point, three natives came running down to the bank, calling out and beckoning for us to land. They all carried long spears, and in the hands of one was a large tomahawk. Proceeded up the river and reached the two first islands by 4.10 P.M. The wind now flew round to the south, which, against the tide, caused such a sea that with some little difficulty we kept the things in the boat dry. When we came abreast of the next two islands the wind increased from south, rising the dust and leaves in clouds, and we had to hold on to the mangroves to save our boat from taking in water. From Kangaroo Point to these islands the river banks are nearly one unbroken line of mangroves, behind which, in places, there appear to be extensive mangrove swamps. The islands consist of a mass of mangrove-trees, the tide at high-water flowing in among them. Entered the western branch of the river at 6.30 P.M., pushed on through the most tortuous reaches, having a fair tide, and hopes of getting fresh water, as the river was said by Captain Stokes to be fresh above Island Reach. We had now been some few hours without any, and one of the men was knocked up through drinking salt-water. At midnight passed through Island Reach, when, upon tasting the water, it was as salt as the sea. Mosquitoes now began to become troublesome.

Nov. 14th.—Passed through the large bend beyond Island Reach and by the remainder of the islands, when the mosquitoes became so thick and troublesome that we could pull no longer. At 3 A.M. we landed, lit a fire, rolled ourselves up in our blankets, and tried to get sleep for two hours, but

the mosquitoes kept themselves too fully occupied to allow of sleep, so we started again at daybreak. The river now begins to wear a different aspect, banks from 30 to 35 feet high show themselves with a few straggling gum-trees, but the mangroves in most places still line the river. We passed the 30 feet red sandstone cliffs, when another of the men was taken ill. At Alligator Point we encamped for a short time for a rest, but at 11:15 A.M. started again and pulled on against the tide. Passing up Hope Reach I had three men unable to work. The country bears a better appearance; undulating plains stretch away on each side of the river covered with gum-trees, having a very parched and arid appearance. Along the river sides are growing a species of melaleuca and casuarina; the river banks are much cut up by large ravines and gullies; these again are choked with trees and masses of earth. Camped at dusk near the tall palm-trees marked on the charts. I made a drink here that proved less disagreeable than pure salt-water, of which we all began to feel the effects: it was made by boiling flour, sugar, and salt-water together; mixed thin it was drinkable. Two of the men, during the heat of the day, had become quite delirious, but in the cool of the evening they were much better. Wind during the day from the south; 11:30 P.M. started with a fair tide.

Nov. 15th.—At 2:15 A.M. came to the wished-for junction of the river at the end of Hope Reach; one branch trending to the westward, the other running to the south. We pulled up the latter some distance, but could not find any fresh water, though there was certainly a slight improvement, it not being quite so salt. Camped until daylight, when we pulled up the river again, till it became choked with snags and fallen trees. A few tall palms, some pandanus, a small flagellaria cane, and a drooping melaleuca, were growing on the river banks, but even here mangroves are to be seen in small patches. Landed on the left bank of the river and came upon the tracks of Mr. Gregory's party. Proceeding up this branch of the river to the southward, with two men, I followed the tracks of the horses for some distance, until they crossed the river; here a number of trees had been barked; we still followed the river for some distance, until it became very narrow and nothing but a dry watercourse. So far there was no fresh water procurable. I went to the Plains of Promise, which bear as barren an aspect as any country I had seen in North Australia. The soil is a light sandy loam; the grass had been burnt off, so that a few crooked gum-trees were the most conspicuous of the flora. After taking a good view of the surrounding country, which gave no appearance of improvement in any direction, we returned to the boat and pulled down to the junction. Before starting, I planted 200 tamarind-seeds on the river bank. At the landing-place the depth of this arm of the river is from 14 to 15 feet. Fish appeared scarce; vampire-bats very numerous. The river banks are much cut in here by small and deep watercourses; I landed on the point, and found the marked tree of Mr. Gregory with directions where to find the letters, which I procured. The date of his arrival was on the 30th of August. Trees had also been cut here by the crew of the *Torch*, and the name of Lieut. Chimmo was cut in large letters on a gum-tree, dated August 3rd. Any letters that had been left by Lieut. Chimmo I concluded had been procured by Mr. Gregory. I left marks here by cutting my name upon a large gum-tree, with directions where to dig for a letter which I buried at the foot of the tree for Mr. Baines, as he had not yet arrived at the river. We pulled three miles up the western arm, and found the water very slightly brackish, so we camped for two hours and had a good pot of tea with a short sleep, which was very much needed. This arm of the river is full of dead snags; it is much larger than the southern branch. There must be a fine supply of fresh water from a good source to be running so strong at this (the driest) season; immense large forest trees lined the banks, having been

carried down by the floods. The river banks were covered in many places with green grass. The trees on the banks still retain their green foliage, and undoubtedly this is the finest part of the river. The camping places of natives were more numerous, and heaps of mussel-shells were strewn round their fires. The tide was now at ebb, so we filled every article that could be made to hold water and started down the river again, considerably refreshed. In passing I landed at the western and eastern angles; at the former there were no trees marked; at the latter Mr. Gregory had marked some trees, dated September 2nd, and had buried more letters, which I procured, and reached the tall palm-trees at 8 P.M., when meeting the flood-tide, we camped for the night.

Nov. 16th.—Started at 5 A.M. with the first of the tide, having had a restless night caused by the mosquitoes; passed the 30 feet cliffs, through Island Reach, and within four miles of the junction near the salt-water arm. At 5 P.M., the tide having turned, we encamped on a high, soft, mud-bank by the side of the river, the only spot within some miles that was free from mangroves. Although these banks are some feet above high water, yet the surface of them is quite soft, with a sticky kind of bluish clay covered with a coarse grass. After supper we rolled ourselves up in our blankets, and lay down for sleep, but no sooner did it become dusk than our old enemies, the mosquitoes, commenced in such good earnest, that we were forced to take to the boat. Every precaution, even a smoking fire, appearing useless, we pulled down to the junction and came to again, to wait for the turn of tide.

Nov. 17th.—We were all very glad when the tide turned, for the mosquitoes drove away all sleep. We started at 3:30 A.M. with a good flood-tide, passed all the Mangrove Islands, and seeing a good clear part of the bank on the left side, about seven miles from the entrance of the river, we landed and had breakfast. At this part of the river a small sandy alluvial plain descends, having a bank about 20 feet high. At the foot of this, at low water, the bed is seen covered with numbers of shells of many genera—*arcas*, *cytheras*, barnacles, &c. Trees were scattered here and there among them. We reached Kangaroo Point by 9 A.M., pushed out over the bar, and it being very low-water, we had to drag the boat about $1\frac{1}{2}$ mile over the bar, but in two hours after leaving Kangaroo Point we reached the vessel, December 16th, 1857.

ERRATA.

At page 65, Equation 3, instead of a , read $a + b$, in both denominators.

At page 231, after "Estimate for 1858," insert "and Resolutions respecting Secretarial Duties."

At page 323, at the 17th line from the foot, instead of *Pangany*, read *Kingany*.

* * All communications must be prepaid.

LIST OF MAPS.

[In the Introductory Notice to 'Fullarton's Royal Illustrated Atlas,' the want of a Geographical Catalogue raisonnée of Maps and Charts was some years ago pointed out, and it was suggested that a Catalogue might be made in which should be inserted the title, scale, meridian, place and date of publication, number of sheets, dimensions, etc., of the principal Maps of the World. To a certain extent this has been carried out in the Map-rooms of the Royal Geographical Society by Mr. C. George, the Curator; and the following Tables of the principal Maps of European States, etc., are here given. Any additions to, or corrections of the list will be most thankfully received by the Editor.]

TABLE I.—ALPHABETICAL LIST OF THE PRINCIPAL MAPS OF EUROPEAN STATES AND THEIR COLONIES.

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TABLE II.—PRINCIPAL MAPS OF EUROPEAN STATES AND THEIR COLONIES.

(Arranged to Scale, May, 1858.)

No.	Year.	Name of the Country.	Scale.			Sheets when Complete.	State of Advance.
			A. Natural.	B. Statute Mile.	C. Geog. Mile.		
				miles. inches.	miles. inches.		
1	1828	Turkey, &c. (Cotta)	$\frac{1}{1,000,000}$	1=0·063	1=0·073	6	Finished.
2	1854	Denmark (Bull)	$\frac{1}{933,333}$	1=0·069	1=0·078	1	Finished.
3	?	Iceland (Olsen)	$\frac{1}{960,000}$	1=0·066	1=0·076	1	Finished.
4	1857	France (Etat Major)	$\frac{1}{864,000}$	1=0·079	1=0·084	?	20
5	1822	Austrian Empire (Fallon)	$\frac{1}{864,000}$	1=0·073	1=0·090	9	Finished.
6	1801	Russia (Imperial Staff)	$\frac{1}{800,000}$	1=0·079	1=0·094	113	Finished.
7	1848	Denmark (Bull)	$\frac{1}{800,000}$	1=0·079	1=0·094	1	Finished.
8	1822	Turkey in Europe (Lapie)	$\frac{1}{800,000}$	1=0·079	1=0·094	15	Finished.
9	1785	Norway (Enckson)	$\frac{1}{800,000}$	1=0·079	1=0·094	2	Finished.
10	1829	Germany (Stieler)	$\frac{1}{750,000}$	1=0·085	1=0·097	25	?
11	1823	Spain and Portugal (French Staff)	$\frac{1}{740,000}$	1=0·086	1=0·098	16	Finished.
12	1845	Norway (Munch)	$\frac{1}{700,000}$	1=0·089	1=0·103	1	Finished.
13	1854	Belgium, Railway Map (Havenne)	$\frac{1}{620,000}$	1=0·102	1=0·118	1	Finished.
14	1856	Austrian Empire (Scheda)	$\frac{1}{576,000}$	1=0·110	1=0·126	20	6
15	1829	Turkey	$\frac{1}{576,000}$	1=0·110	1=0·126	21	Finished.
16	1843	Italy (Civelli)	$\frac{1}{555,555}$	1=0·114	1=0·131	28	Finished.
17	?	Bavaria	$\frac{1}{500,000}$	1=0·126	1=0·146	1	Finished.
18	1853	Sardinia, Island of	$\frac{1}{500,000}$	1=0·126	1=0·146	1	Finished.
19	1812	Russia (French Staff)	$\frac{1}{500,000}$	1=0·126	1=0·146	79	Finished.
20	1848	Morocco (Dépôt de la Guerre) ..	$\frac{1}{500,000}$	1=0·126	1=0·146	2	Finished.
21	1846	France (Vallot)	$\frac{1}{500,000}$	1=0·126	1=0·146	6	Finished.
22	1828	France (Dubrena)	$\frac{1}{500,000}$	1=0·126	1=0·146	12	Finished.
23	1838	Germany (Woerl)	$\frac{1}{500,000}$	1=0·126	1=0·146	28	?
24	1815	Sweden & Norway, South (Forsell)	$\frac{1}{500,000}$	1=0·126	1=0·146	8	Finished.
25	1817	France (Donnet)	$\frac{1}{388,900}$	1=0·163	1=0·189	20	Finished.
26	1845	Iceland (Olsen)	$\frac{1}{480,000}$	1=0·132	1=0·152	4	Finished.
27	1846	Denmark (Olsen)	$\frac{1}{480,000}$	1=0·132	1=0·152	2	Finished.
28	1806	Hungary (Lipszky)	$\frac{1}{469,472}$	1=0·135	1=0·155	12	Finished.
29	1847	Hungary (Schedius and Blashnek)	$\frac{1}{469,472}$	1=0·135	1=0·155	9	Finished.
30	1808	Naples, Kingdom of	$\frac{1}{444,444}$	1=0·143	1=0·164	6	?
31	1854	Austria, Transylvania	$\frac{1}{432,000}$	1=0·146	1=0·165	2	Finished.
32	1856	Russia (Schubert)	$\frac{1}{420,000}$	1=0·151	1=0·170	60	35
33	1839	Bavaria	$\frac{1}{400,000}$	1=0·158	1=0·182	5	Finished.

TABLE II.—PRINCIPAL MAPS OF EUROPEAN STATES, &c.—*continued.*

No.	Year.	Name of the Country.	Scale.			Sheets when Complete.	State of Advance.
			A. Natural.	B. Statute Mile.	C. Geog. Mile.		
				miles, inches.	miles, inches.		
34	1826	Greece (Lapie)	$\frac{1}{400,000}$	1=0·158	1=0·182	4	Finished.
35	1856	Algeria (Dépôt de la Guerre) ..	$\frac{1}{400,000}$	1=0·158	1=0·182	2	Finished.
36	1854	,, Constantine (Etat Major)	$\frac{1}{400,000}$	1=0·158	1=0·182	2	Finished.
37	1856	,, Oran (Etat Major)	$\frac{1}{400,000}$	1=0·158	1=0·182	2	Finished.
38	1857	Tunis	$\frac{1}{400,000}$	1=0·158	1=0·182	2	Finished.
39	1833	Tuscany (Segato)	$\frac{1}{400,000}$	1=0·158	1=0·182	?	?
40	1857	,, (Pozzi)	$\frac{1}{400,000}$	1=0·158	1=0·182	?	?
41	1840	Russia, Poland	$\frac{1}{384,000}$	1=0·163	1=0·189	8	Finished.
42	1851	Denmark, &c. (Bull)	$\frac{1}{384,000}$	1=0·165	1=0·196	4	Finished.
43	1856	Switzerland (Ziegler)	$\frac{1}{380,000}$	1=0·167	1=0·198	4	Finished.
44	1820	Jutland (General Staff)	$\frac{1}{370,000}$	1=0·171	1=0·200	1	Finished.
45	1838	Denmark (Gliemann)	$\frac{1}{363,000}$	1=0·172	1=0·201	4	Finished.
46	1824	Spain, N.W. (Capitaine)	$\frac{1}{345,000}$	1=0·183	1=0·211	13	Finished.
47	1816	France (Capitaine)	$\frac{1}{345,000}$	1=0·183	1=0·211	24	Finished.
48	?	France (Dépôt de la Guerre) ..	$\frac{1}{320,000}$	1=0·198	1=0·228	64	16
49	1848	{ Holstein Lauenburg } (Schumacher) ..	$\frac{1}{320,000}$	1=0·198	1=0·228	1	Finished.
		{ Lübeck }					
50	1852	France (Etat Major)	$\frac{1}{320,000}$	1=0·198	1=0·228	39	19
51	1854	Holstein (Bidant)	$\frac{1}{300,000}$	1=0·199	1=0·230	1	Finished.
52	?	Dutch Indies	$\frac{1}{290,000}$	1=0·218	1=0·250	50	20
53	1853	Austria, Servia, &c.	$\frac{1}{288,000}$	1=0·220	1=0·253	4	Finished.
54	?	,, Galicia	$\frac{1}{288,000}$	1=0·220	1=0·253	33	Finished.
55	1854	,, Hungary	$\frac{1}{288,000}$	1=0·220	1=0·253	?	32
56	1821	Spain and Portugal (Beauvoisin)	$\frac{1}{288,000}$	1=0·220	1=0·253	63	Finished.
57	1858	Wallachia (Von Fligely)	$\frac{1}{288,000}$	1=0·220	1=0·253	6	?
58	1853	Naples, Kingdom of (Marzolla) ..	$\frac{1}{280,000}$	1=0·227	1=0·248	15	?
59	1799	Italy (Bacher D'Abbé)	$\frac{1}{256,000}$	1=0·250	1=0·286	54	Finished.
60	1848	Egypt (Linant Bey)	$\frac{1}{250,000}$	1=0·253	1=0·290	4	Finished.
61	?	Switzerland (Dufour)	$\frac{1}{250,000}$	1=0·253	1=0·290	4	?
62	1841	Sardinia, Terra Firma	$\frac{1}{250,000}$	1=0·253	1=0·290	6	?
63	1857	Hesse, Duchy of, &c.	$\frac{1}{250,000}$	1=0·253	1=0·290	2	Finished.
64	1845	Sardinia, Island (Marmora) ..	$\frac{1}{250,000}$	1=0·253	1=0·290	2	Finished.
65	1857	Saxony (Hornig)	$\frac{1}{250,000}$	1=0·253	1=0·290	4	Finished.
66	1858	Denmark (Bath)	$\frac{1}{240,000}$	1=0·264	1=0·310	32	1

TABLE II.—PRINCIPAL MAPS OF EUROPEAN STATES, &c.—*continued.*

No.	Year.	Name of the Country.	Scale.			Sheets when Complete.	State of Advance.
			A. Natural.	B. Statute Mile.	C. Geog. Mile.		
				miles. inches.	miles. inches.		
67	1836	Slesvig (Olsen)	$\frac{1}{240,000}$	1 = 0·264	1 = 0·310	1	Finished.
68	1820	Denmark (Gliemann)	$\frac{1}{240,000}$	1 = 0·264	1 = 0·310	32	Finished.
69	1840	St. Petersburg, Govt. of (Schubert)	$\frac{1}{210,000}$	1 = 0·301	1 = 0·356	8	Finished.
70	?	Crimea (Betew)	$\frac{1}{210,000}$	1 = 0·301	1 = 0·356	8	?
71	1857	Baden	$\frac{1}{200,000}$	1 = 0·316	1 = 0·365	6	2
72	1852	Greece (Lapie)	$\frac{1}{200,000}$	1 = 0·316	1 = 0·365	20	Finished.
73	1832	Morea (Dépôt de la Guerre) ..	$\frac{1}{200,000}$	1 = 0·316	1 = 0·365	6	Finished.
74	1827	Norway (Gyessing and Ramm) ..	$\frac{1}{200,000}$	1 = 0·316	1 = 0·365	?	12
75	1848	Spain (Coello)	$\frac{1}{200,000}$	1 = 0·316	1 = 0·365	60	33
76	?	Sweden	$\frac{1}{200,000}$	1 = 0·316	1 = 0·365	?	?
77	1830	Tuscany (Inghirami)	$\frac{1}{200,000}$	1 = 0·316	1 = 0·365	?	Finished.
78	1848	Germany (Reymann)	$\frac{1}{200,000}$	1 = 0·316	1 = 0·365	359	Finished.
79	1855	Algeria, Grande Kabylie (Et. Major)	$\frac{1}{200,000}$	1 = 0·316	1 = 0·365	1	Finished.
80	1855	Russia, Crimea (Mukin)	$\frac{1}{195,528}$	1 = 0·330	1 = 0·379	3	?
81	1839	Russia, Livonia	$\frac{1}{187,500}$	1 = 0·340	1 = 0·390	6	Finished.
82	1848	Belgium	$\frac{1}{160,000}$	1 = 0·396	1 = 0·465	9	?
83	1837	Denmark (Mansa)	$\frac{1}{160,000}$	1 = 0·396	1 = 0·465	18	Finished.
84	1803	Prussia, Ancient	$\frac{1}{150,000}$	1 = 0·422	1 = 0·486	25	Finished.
85	1849	Austria, Bohemia	$\frac{1}{144,000}$	1 = 0·440	1 = 0·506	39	26
86	?	,, Moravia and Silesia	$\frac{1}{144,000}$	1 = 0·440	1 = 0·506	20	Finished.
87	1810	,, Salzburg	$\frac{1}{144,000}$	1 = 0·440	1 = 0·506	15	Finished.
88	1813	,, Proper	$\frac{1}{144,000}$	1 = 0·440	1 = 0·506	31	Finished.
89	1825	,, Tyrol	$\frac{1}{144,000}$	1 = 0·440	1 = 0·506	24	Finished.
90		Styria and Illyria	$\frac{1}{144,000}$	1 = 0·440	1 = 0·506	36	
91	1855	Spain, Province of Oviedo (Schulz)	$\frac{1}{127,500}$	1 = 0·497	1 = 0·570	3	Finished.
92	1856	Malta and Gozo (Ordnance) ..	$\frac{1}{126,720}$	1 = 0·500	1 = 0·574	2	Finished.
93	?	Russia and Poland, &c.	$\frac{1}{126,000}$	1 = 0·503	1 = 0·576	900	437
94	1857	Switzerland (Zürich)	$\frac{1}{125,000}$	1 = 0·508	1 = 0·582	1	Finished.
95	1853	Switzerland, St. Gall	$\frac{1}{125,000}$	1 = 0·508	1 = 0·582	1	Finished.
96		Denmark	$\frac{1}{120,000}$	1 = 0·528	1 = 0·607	18	Finished.
97	1854	Slesvig and Als	$\frac{1}{120,000}$	1 = 0·528	1 = 0·607	6	2
98	1829	Saxony (Finance Survey)	$\frac{1}{118,750}$	1 = 0·534	1 = 0·614	28	Finished.
99	1829	Holland (Krayenhoff)	$\frac{1}{115,200}$	1 = 0·550	1 = 0·640	9	?
100	1855	Austria, Galicia	$\frac{1}{115,200}$	1 = 0·550	1 = 0·640	60	30
101	1808	Naples (Zannoni)	$\frac{1}{114,348}$	1 = 0·554	1 = 0·635	31	?

TABLE II.—PRINCIPAL MAPS OF EUROPEAN STATES, &c.—*continued.*

No.	Year.	Name of the Country.	Scale.			Sheets when Complete.	State of Advance
			A. Natural.	B. Statute Mile.	C. Geog. Mile.		
				miles, inches.	miles, inches.		
102	1774	Tyrol (Anich and Huber)	$\frac{1}{102,886}$	1=0.615	1=0.696	20	?
103	?	Finland	$\frac{1}{100,800}$	1=0.628	1=0.729	?	?
104	1810	Bavaria	$\frac{1}{100,000}$	1=0.633	1=0.729	128	Finished.
105	1856	Brunswick (Strombeck)	$\frac{1}{100,000}$	1=0.633	1=0.729	4	Finished.
106	1852	Hanover (Roemer)	$\frac{1}{100,000}$	1=0.633	1=0.729	?	8
107	,,	,, and Brunswick (Papen)	$\frac{1}{100,000}$	1=0.633	1=0.729	65	Finished.
108	,,	Hohenzollern, Duchies of (Liebenow)	$\frac{1}{100,000}$	1=0.633	1=0.729	?	?
109	?	Prussia, East	$\frac{1}{100,000}$	1=0.633	1=0.729	320	164
110	?	Sweden, Villages	$\frac{1}{100,000}$	1=0.633	1=0.729	?	?
111	1834	Switzerland (Dufour)	$\frac{1}{100,000}$	1=0.633	1=0.729	25	19
112	?	Prussia, Pomerania	$\frac{1}{100,000}$	1=0.633	1=0.729	56	
113	1852	Belgium (Vander Maelen)	$\frac{1}{100,000}$	1=0.633	1=0.729	9	5
114	?	Brandenburg, Province (Staff) ..	$\frac{1}{100,000}$	1=0.633	1=0.729	44	Finished.
115	1851	Freiburg, Canton of (Stryienski)	$\frac{1}{100,000}$	1=0.633	1=0.729	1	Finished.
116	?	Prussia, Posen	$\frac{1}{100,000}$	1=0.633	1=0.729	41	Finished.
117	?	Portugal	$\frac{1}{100,000}$	1=0.633	1=0.729	36	2
118	?	Sweden (Topo. Corps)	$\frac{1}{100,000}$	1=0.633	1=0.729	?	?
119	1856	Denmark (Bull)	$\frac{1}{96,000}$	1=0.660	1=0.760	23	?
120	?	Switzerland, Neuchatel (Osterwald)	$\frac{1}{96,000}$	1=0.660	1=0.760	1	Finished.
121	1843	Lübeck	$\frac{1}{91,700}$	1=0.691	1=0.795	1	Finished.
122	?	Venetian Lombardy	$\frac{1}{86,400}$	1=0.738	1=0.844	42	Finished.
123	1783	France (Cassini)	$\frac{1}{86,400}$	1=0.738	1=0.844	184	Finished.
124	1842	Modena (Austrian Staff)	$\frac{1}{86,400}$	1=0.738	1=0.844	8	Finished.
125	1828	Parma (Austrian Staff)	$\frac{1}{86,400}$	1=0.738	1=0.844	9	Finished.
126	1851	Tuscany and Papal States (Austr. St.)	$\frac{1}{86,400}$	1=0.738	1=0.844	52	Finished.
127	?	Austria, Upper	$\frac{1}{86,400}$	1=0.738	1=0.844	12	Finished.
128	1848	Russia, Government of Tver ..	$\frac{1}{84,000}$	1=0.754	1=0.868	159	
129	1854	Belgium (Gerard)	$\frac{1}{80,000}$	1=0.790	1=0.912	25	
130	1853	Slesvig	$\frac{1}{80,000}$	1=0.790	1=0.912	81	8
131	1833	France	$\frac{1}{80,000}$	1=0.790	1=0.912	258	190
132	1815	Naples and Sicily	$\frac{1}{80,000}$	1=0.790	1=0.912	68	8
133	1832	Prussia, Rhenish, (Schropp, &c.)	$\frac{1}{80,000}$	1=0.790	1=0.912	72	Finished.
134	1857	Roman States (Dépôt de la Guerre)	$\frac{1}{80,000}$	1=0.790	1=0.912	4	Finished.
135	1840	Belgium (Vander Maelen)	$\frac{1}{80,000}$	1=0.790	1=0.912	25	Finished.
136	?	Thurgau, Canton of (Sulzberger)	$\frac{1}{80,000}$	1=0.790	1=0.912	1	Finished.

TABLE II.—PRINCIPAL MAPS OF EUROPEAN STATES, &c.—*continued.*

No.	Year.	Name of the Country.	Scale.			Sheets when Complete.	State of Advance.
			A. Natural.	B. Statute Mile.	C. Geog. Mile.		
				miles. inches.	miles. inches.		
37	?	Westphalia	$\frac{1}{80,000}$	1=0·790	1=0·912	72	Finished.
38	1849	Limburg, Duchy of	$\frac{1}{75,000}$	1=0·846	1=0·972	4	Finished.
39	1801	England and Wales	$\frac{1}{63,360}$	1=1·000	1=1·151	110	90
40	?	Spain (Itineraries)	$\frac{1}{60,000}$	1=1·056	1=1·224	?	?
41	1832	Soleure, Canton (Walker)	$\frac{1}{60,000}$	1=1·056	1=1·224	1	Finished.
42	1837	Saxony	$\frac{1}{57,600}$	1=1·100	1=1·267	20	14
43	?	Algeria	$\frac{1}{50,000}$	1=1·267	1=1·459	?	?
44	1838	Baden	$\frac{1}{50,000}$	1=1·267	1=1·459	56	Finished.
45	1812	Bavaria	$\frac{1}{50,000}$	1=1·267	1=1·459	112	92
46	1840	Hesse Cassel	$\frac{1}{50,000}$	1=1·267	1=1·459	34	?
47	1833	,, Darmstadt	$\frac{1}{50,000}$	1=1·267	1=1·459	27	?
48	1832	,, Duchy	$\frac{1}{50,000}$	1=1·267	1=1·459	31	Finished.
49	1840	,, Principality of	$\frac{1}{50,000}$	1=1·267	1=1·459	44	33
50	1850	Holland	$\frac{1}{50,000}$	1=1·267	1=1·459	62	17
51	1788	Mecklenburg Schwerin	$\frac{1}{50,000}$	1=1·267	1=1·459	16	Finished.
52	1856	Oldenburg	$\frac{1}{50,000}$	1=1·267	1=1·459	16	2
53	1850	Sardinia (Cassage)	$\frac{1}{50,000}$	1=1·267	1=1·459	91	51
54	1829	Württemberg	$\frac{1}{50,000}$	1=1·267	1=1·459	55	Finished.
55	?	Neuchatel, Canton of	$\frac{1}{50,000}$	1=1·267	1=1·459	?	
56	1834	Algeria	$\frac{1}{50,000}$	1=1·267	1=1·459	2	Finished.
57	?	Berne, Canton	$\frac{1}{50,000}$	1=1·267	1=1·459	2	
58	?	Vaud, Canton of	$\frac{1}{50,000}$	1=1·267	1=1·459	?	
59	1848	Aargau, Canton (Michaelis)	$\frac{1}{50,000}$	1=1·267	1=1·459	4	Finished.
60	1855	Freiburg, Canton (Stryienski)	$\frac{1}{50,000}$	1=1·267	1=1·459	4	Finished.
61	1857	Vienna, &c.	$\frac{1}{48,200}$	1=1·467	1=1·692	4	Finished.
62	1835	Crimea	$\frac{1}{42,000}$	1=1·508	1=1·735	89	Finished.
63	1848	Plan of Moscow	$\frac{1}{42,000}$	1=1·508	1=1·735	6	Finished.
64	1820	,, of Vilna	$\frac{1}{42,000}$	1=1·508	1=1·735	1	Finished.
65	?	Denmark, Towns	$\frac{1}{40,000}$	1=1·584	1=1·846	?	?
66	1780	Mecklenburg Strelitz	$\frac{1}{38,900}$	1=1·869	1=2·153	9	Finished.
67	?	Frankfort	$\frac{1}{25,000}$	1=2·534	1=2·915	1	Finished.
68	1857	Luxemburg	$\frac{1}{25,000}$	1=2·534	1=2·915	4	Finished.
69	?	Sardinia, Towns	$\frac{1}{25,000}$	1=2·534	1=2·915	6	Finished.
70	1851	Zürich, Canton of	$\frac{1}{25,000}$	1=2·534	1=2·915	25	15
71	1854	{Switzerland (St. Gallen and Ap- penzell, Cantons of)}	$\frac{1}{25,000}$	1=2·534	1=2·915	16	?

TABLE II.—PRINCIPAL MAPS OF EUROPEAN STATES, &c.—*continued.*

No.	Year.	Name of the Country.	Scale.			Sheets when Complete.	State of Advance.
			A. Natural.	B. Statute Mile.	C. Geog. Mile.		
				miles. inches.	miles. inches.		
172	?	Switzerland (St. Gall, Canton of)	$\frac{1}{25,000}$	1 = 2·534	1 = 2·915	16	Finished.
173	1846	Switzerland (Zug)	$\frac{1}{25,000}$	1 = 2·534	1 = 2·915	1	Finished.
174	?	Geneva, Canton of (Dufour) ..	$\frac{1}{25,000}$	1 = 2·534	1 = 2·915	4	Finished.
175	1819	Naples, Environs of (Staff Survey)	$\frac{1}{25,000}$	1 = 2·534	1 = 2·915	8	Finished.
176	?	Rome (Dépôt de la Guerre)	$\frac{1}{20,000}$	1 = 3·168	1 = 3·648	?	Finished.
177	1854	Belgium (Vander Maelen)	$\frac{1}{20,000}$	1 = 3·168	1 = 3·648	250	Finished.
178	1853	Sweden, Towns (Lyungren)	$\frac{1}{20,000}$	1 = 3·168	1 = 3·648	?	46
179	1834	Ireland (Ordnance Survey)	$\frac{1}{10,560}$	1 = 6·000	1 = 6·910	1907	Finished.
180	1846	Scotland (ditto)	$\frac{1}{10,560}$	1 = 6·000	1 = 6·910	?	249
181	?	Bavaria	$\frac{1}{10,000}$	1 = 6·326	1 = 7·296	97	Finished.
182	1830	Holland, Rivers	$\frac{1}{10,000}$	1 = 6·326	1 = 7·296	101	70
183	?	St. Petersburg, Plan of	$\frac{1}{8,400}$	1 = 7·543	1 = 8·692	9	Finished.
184	1845	Russia, Towns	$\frac{1}{8,400}$	1 = 7·543	1 = 8·692	?	?
185	?	Prussia, Towns	$\frac{1}{6,250}$	1 = 10·137	1 = 11·610	?	?
186	1828	St. Petersburg (Schubert)	$\frac{1}{4,200}$	1 = 15·186	1 = 17·384	24	Finished.
187	?	Bavaria, Towns	$\frac{1}{2,500}$	1 = 25·334	1 = 29·18	?	?
188	1840	Belgium, Towns	$\frac{1}{2,500}$	1 = 25·334	1 = 29·18	34	?
189	?	Württemberg, Towns	$\frac{1}{2,500}$	1 = 25·334	1 = 29·18	?	?

TABLE III.—BRITISH MAPS, &c.

No.	Year.	Name of the Country.	Scale.			Sheets when Complete.	State of Advance.
			A. Natural	B. Statute Mile.	C. Geog. Mile.		
				miles. inches.	miles. inches.		
190	1801	England and Wales—General ..	$\frac{1}{63,360}$	1 = 1·000	1 = 1·151	110.	92
191	1846	„ 6 Counties ..	$\frac{1}{10,560}$	1 = 6·000	1 = 6·910	726?	422
192		„ London ..	$\frac{1}{10,560}$	1 = 6·000	1 = 6·910	26?	Finishe
193	1850	„ London ..	$\frac{1}{5,280}$	1 = 12·000	1 = 13·818	44	Finishe
194	1850	„ London ..	$\frac{1}{1,056}$	1 = 60·000		831	
195	1855	„ 32 Parishes ..	$\frac{1}{2,500}$	1 = 25·334	1 = 29·180		805
196	1848	„ 71 Towns ..	$\frac{1}{1,056}$	1 = 60·000			1137
197	1852	„ Plymouth ..	$\frac{1}{500}$	1 = 126·72			19

TABLE III.—BRITISH MAPS, &c.—continued.

No.	Year.	Name of the Country.	Scale.			Sheets when Complete.	State of Advance.
			A. Natural.	B. Statute Mile.	C. Geog. Mile.		
08		Scotland—General	$\frac{1}{63,360}$	miles. inches. 1 = 1·000	miles. inches. 1 = 1·151	121	Finished.
09		,, 18 Counties	$\frac{1}{10,560}$	1 = 6·000	1 = 6·910	651	267
10		,, 68 Parishes	$\frac{1}{2,500}$	1 = 25·334	1 = 29·180	1379	Finished.
01		,, 13 Towns	$\frac{1}{1,056}$	1 = 60·000		116	Finished.
02	1857	Ireland—General	$\frac{1}{63,360}$	1 = 1·000	1 = 1·151	59	?
03	1834	,, 33 Counties	$\frac{1}{10,560}$	1 = 6·000	1 = 6·910	1097	Finished.
04	1847	,, Towns (Dublin)	$\frac{1}{1,056}$	1 = 60·000		33	Finished.
05		Malta and Gozo	$\frac{1}{126,720}$	1 = 0·500	1 = 0·574	2	Finished.
05*	1845	Hong Kong (Collinson, R. E.) ..	$\frac{1}{15,840}$	1 = 4·000	1 = 4·604	4	Finished.
06	1827	India (Staff)	$\frac{1}{233,640}$	1 = 0·245	1 = 0·282	117	58
07		Ceylon Island (Fraser)	$\frac{1}{253,440}$	1 = 0·250	1 = 0·288	8	?
07*		,, Kandian Districts (do.) ..	$\frac{1}{63,360}$	1 = 1·000	1 = 1·151	4	Finished.
08	1847	England and Wales (Johnston) ..	$\frac{1}{379,400}$	1 = 0·167	1 = 0·200	4	Finished.
09	1855	,, (Creighton)	$\frac{1}{316,500}$	1 = 0·200	1 = 0·230	9	Finished.
10	1815	,, (Arrowsmith)	$\frac{1}{189,700}$	1 = 0·334	1 = 0·390	18	Finished.
11	1858	Scotland (Johnston)	$\frac{1}{633,600}$	1 = 0·100	1 = 0·118	1	Finished.
12	1855	,, (Carrington)	$\frac{1}{316,500}$	1 = 0·200	1 = 0·230	6	Finished.
13	1838	Ireland (Walker)	$\frac{1}{357,600}$	1 = 0·177	1 = 0·206	2	Finished.
14	1838	,, (Larcom)	$\frac{1}{233,440}$	1 = 0·250	1 = 0·290	6	Finished.

The Ordnance Survey of the British Isles being projected on the statute mile of 5280 feet, the column B. affords a ready means of comparing the Ordnance Survey with any foreign Government map. Comparing the Government Survey of Belgium with the Ordnance Survey of Ireland, place the scales one above the other, with the names against each, thus:—

Belgium 3·168
Ireland 6·000

= ½ nearly,

shows at once that the Belgian Survey is on one-half the scale of the Irish Survey.

Russia (Tver) 0·754
Scotland 6·000

= ⅙:

The Russian Survey is, therefore, ⅙ the size of that of Scotland.

All the foreign maps are projected on the scale C.

Column A. of the Scales will be found very useful in obtaining the proportion of the inch to a mile from Maps or Charts on which the Natural Scale only is given. Enter the column A., and find the nearest number to the given Natural Scale, and on the same line towards the right will be seen the proportion it bears to the statute and geographical mile.

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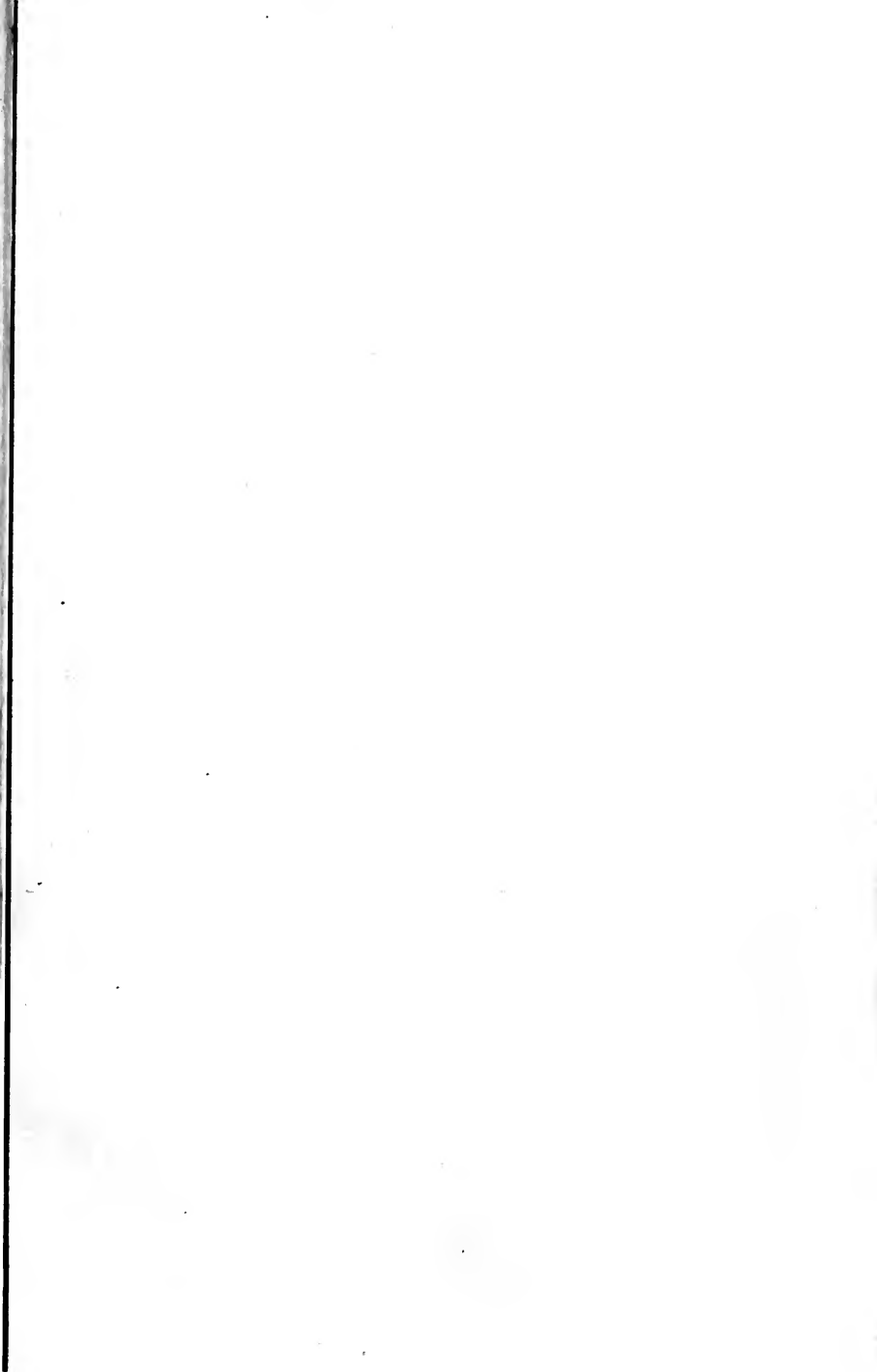
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